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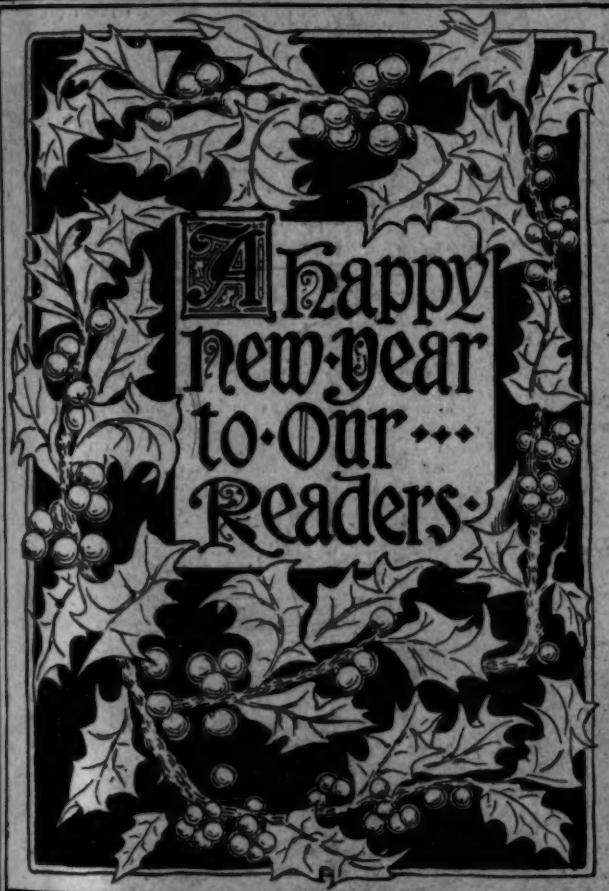

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VOL. XXVII No. 7

EDITORIAL, PUBLISHING AND ADVERTISING OFFICES OF "THE PRACTICAL TEACHER"
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A MONTHLY MAGAZINE AND REVIEW

FOR THE SCHOOL-ROOM AND THE STUDY

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EDUCATION IN PARLIAMENT.

THE BILL IN THE LORDS AND COMMONS.

FLUSHED with enormous victory at the polls, a Liberal Government determined that an Education Bill should be their first great Bill, and that it should be a very, very great Bill indeed. The still, small voice of wise counsel which advised a modest but a sufficing measure went unheard or unheeded, and a very, very great Bill indeed was brought in. All went fairly well with the Bill in the House of its birth, but when it went to what is constitutionally a higher House, its experiences began to be painful. A pathetic German ballad tells how a step-child weeps at night—every night—with the woe of its ill-treatment by its stepmother, and how the child's own mother comes out of her grave to comfort the child. Well, every night for nearly three weeks Mr. Birrell stood on the steps of the throne and heard his Bill maltreated. Spectacles hide the expression in Mr. Birrell's eyes, and tight though humorous lips assist in concealing his feelings; but as for the Bill, as one listened one could positively hear it moan.

Three rows of more or less elderly right reverend gentlemen, appropriately clad in robes of silk and muslin, have been step-mothering the Bill. They have also been transmogrifying it. A squad of sixty temporal peers have been trying to defend it against the attacks of a company of two hundred noble Lords who are vowed to "amend" it. Lord Crewe has acted the part of a somewhat chilly father. Lord Lansdowne has made a most gentlemanly and refined first murderer, and Lord Londonderry has been cast for the heavy part of the wicked uncle. "It is all for your good," has said the Archbishop of Canterbury, with a most benignant smile, as he gave another turn to the rack. The Duke of Devonshire is a sportsman. With him there is an association of ideas between education and sport. While he was President of the Board of Education, there never was a race-day on a course near London when he did not look in at Whitehall. A sportsman likes to see fair play and playing fair. Two or three times during the process of transmogrifying the Bill it has occurred to the Duke that the poor thing was not exactly getting fair play. Arousing himself from the pleasures of siesta, and stifling the inevitable yawn, his Grace has advanced to the table, and, like one of Arthur's Paladins partly suffering from aphasia, has delivered what, by the common and mutual courtesy of other peers who speak worse, has passed for a speech. Of form, finish, and oratorical expression the speech has been devoid, but it has been weighty. Like a hundredweight of bricks it has fallen into the placid waters of the House. There has been a splash, noble lords have recoiled, and *that* particular carving-knife at the throat of the Bill has been withdrawn. Nothing in the whole process of the debates has been quite so striking and influential as these interventions of *carendo tutus*.

The highly respected and able gentleman who used to be known as Sir Michael Hicks-Beach has also tried the art of apt intervention, but he has not succeeded so well as the Duke. Lord St. Aldwyn has been a peer such a ridiculously short time that he can hardly expect to be listened to much yet. It is true that he once led the House of Commons, that he has been Chancellor of the Exchequer, and has been several other ministers in various Governments in turn, but he is not a peer by birth, as Lord Camperdown is. Lord Camperdown's ancestor was an admiral, and Lord Camperdown has been piloting the Opposition upon vast and dangerous seas. He has run them on the rocks more than once, it is true; but all the same he is a peer by birth, and "that solemn Hicks-Beach fellow" is not. Wherefore the Peers have more readily taken their cue from Lord Camperdown than from the "Hicks-Beach fellow."

To watch the debates in the House of Lords on this Bill must have been irritating to the point of bad language, almost, for a Liberal. It has been rather humiliating even for a Conservative. Let it be granted that the peers have meant well, that they are rightfully anxious, concerned, and active for the cause of definite

religious teaching and the inalienable right of the parent to have his child taught his own creed in religion. Nevertheless it would have been more comfortable for their friends who watched them if any of the Peers could have shown some small degree of knowledge of what they were doing to the Bill at any given point. There is no vestry meeting in England which could be carried on with such a want of business procedure and general comprehension as these debates have shown. The Lord Chancellor has been absent, ill, and Lord Onslow, the Chairman of Committees, has all along been in the chair. "Will the Lord Chairman tell us what the question really is?" one peer appealed at the end of a debate of about an hour and three-quarters. "The question is that an amendment be made in the Bill which has already been made in the Bill," said Lord Onslow.

That was not his fault. A chairman in the House of Lords cannot rule a proposal out of order. If a peer desires to move something, he may, and none may stop him, even though the very same motion has been carried, or rejected, immediately before. In the House of Commons the Speaker has frequently ruled out of order and "shut up" Mr. Balfour, Mr. Chamberlain, and Sir Henry Campbell-Bannerman when the occasion required it; but who shall rule out of order and "shut up" a peer?

A state-aided school—that is, a school which has been "contracted out" of rate-aid and municipal or county control—is twice mentioned in the Bill, in places near together. The House of Lords struck "state-aided schools" out in the first of the two places, left it in in the second, and refused to enact it in a third. Nobody except the clerks at the table, perhaps (and it is not quite certain that *they* knew it), understood the shape and meaning of the Bill, as it was modified from day to day during the Committee stage.

The Bishops have been very alert and active. It is difficult for bishops in full fig of silk and lawn to be alert and active, but active and alert they have been. Let us not be censorious of bishops. They are Peers Spiritual; they have a constitutional right to sit in the House of Lords, take part in its debates, move motions, and vote. A Bill affecting Church of England schools and their teachers so drastically as this Bill does is naturally a matter on which the Bishops feel very strongly. There is no need to accuse the Archbishop of inconsistency between what he said about amending the Bill and his action in temporarily destroying it. Archbishops and bishops are not statesmen though they are peers—at least they of the Anglican Church are not. One prefers, after all, in a matter like this, a sincere and destructive Episcopacy to a bench of bishops full of plausible cunning. The Archbishop of Canterbury is evidently a very sincere and thoroughgoing man. If he had been a statesman he would have dealt differently with the Bill during the Committee stage.

Similarly, there is no need to accuse the Marquis of Lansdowne, leader of the Opposition, of being diplomatic. He has been Foreign Secretary—and a good Foreign Secretary, too—and could diplomatise with France and Japan and Russia. But how can he diplomatise with a matter like education, and definite religious education into the bargain, when it sits so near his heart? It is true that to casual observers his management of the House in these debates has seemed full of defects, and he has even appeared to be rather ignorant of the text of the Bill, and almost oblivious of the meaning of amendments. But that is because his heart is in this fray. Lord Salisbury's—the late Lord Salisbury's—absence at a juncture like this may be deplored; but there is this to be said for the present Lord Salisbury—he is about the only peer who, from a distance of ten feet away, can be heard when he speaks to their Lordships. He is heard as clearly and as pleasantly as a ten-foot gramophone.

There is another peer who can make himself heard when he chooses, but up to the time of this present writing he has not chosen. Archibald Primrose, Lord Rosebery, has lain low, like a primrose by the river's brim. Perhaps he is not altogether sorry that a Government which he himself does not ornament should be getting into what one noble lord, during the debates, has called "the very dickens of a mess." But his son-in-law, Lord Crewe, has won laurels. There is nobody else in the House of Lords who speaks quite so urbanely, neatly, and ironically as Lord Crewe, though he is no orator—perhaps for that very reason.

A week elapsed, and the Bill came up for Report. Optimists had supposed that during the interval the leaders—the real leaders—of the Peers would "take a thought and mend." Nothing of the kind, however. On Report the Peers made the Bill, if anything, rather worse. They had already "knocked it into a cocked-hat," and they now jammed the hat down over the eyes of the Government. The Government threw it off in the House of Commons. By a great majority the House of Commons disagreed with the Lords' amendments stock, lock, and barrel, the whole lot. And the stormiest House of Commons scene on recent record signalised the exit of the poor Bill, sent back like a dog with the tin kettle still banging at its tail to the House of Lords. The daily newspapers have told what happened since then.

THE INSPECTOR (NEW STYLE).

In the recently-issued report of the Board of Education, with which we hope to deal more fully next month, we read: "Relieved of much routine work, the inspector will be able to investigate carefully the work going on in certain selected schools, or the teaching of particular subjects, or the methods employed to deal with particular problems of town or country life, without feeling that he is neglecting some formal duty. Under these new conditions the inspectors' reports ought to enable the Board to give advice and assistance to the local authorities throughout the country in a way which hitherto has been found impossible. It may also be hoped that this change will enable the inspectors to find more time for intimate and personal contact with managers and teachers than hitherto they have been able to do. If so, the gain to all concerned will be great. A skilled observer, who recently attended an inspection, remarks, 'It is painful to watch the needless anxiety of the teachers.' In the particular case referred to the teachers were women, but the anxiety he noticed may frequently be observed in the case of men teachers also, though in their case it often shows itself either as a stiff reserve or a nervous pugnacity. It is probably only by fuller intercourse between the inspector and the teacher that this fence between the staff and their adviser can be broken down; and the Board are therefore endeavouring to take further steps to this end."

BRITISH MUSEUM

BY MANY HANDS.

"Quot homines, tot sententiæ."

N.U.T. NOTES.

REPRINTED on pages 347 and 348 of this year's N.U.T. Code are certain *dicta* of the Board of Education concerning "barrack schools," which deserve to be published separately in the largest type at the disposal of the ordinary printing establishments. For some time past certain ultra-economical Local Education Authorities have been considering the advisability of amalgamating school departments and appointing a single head-teacher of the school thus formed, with one teacher attached to each of the departments, who, for *local* purposes, will be regarded and remunerated as a "first assistant," but for the purposes of the *Code* will be treated as the head-teacher of the department. Other Local Education Authorities, again, are very anxious to erect mammoth schools, to be placed under the control of one head-teacher. The Board of Education expressed its unqualified condemnation of both practices, in a letter dated July 7, 1906, to an Authority whose name does not signify in the least. Starting, in promising style, thus—

"Large Schools" Again.

> "It appears to the Board that if there is to be a sound educational organisation, there must be in every school, or separate department of a school, *a real head-teacher, whose duties are confined to that school or department, and who himself takes an active part in the work, and gives a certain amount of definite teaching*"—

the communication proceeds to state that the Board cannot properly sanction any new school, in which the average attendance exceeds five hundred and fifty, being placed under one head-teacher,

> "*and that even this number is larger than is, generally speaking, desirable, and must not be taken as one which will regularly be sanctioned.*"

I most sincerely and devoutly hope *not*. Referring to a proposal that there should be one chief teacher over two departments, under whom there should be two subordinate head-teachers (one for the senior mixed, and the other for the junior mixed), the Board's secretary writes:—

> "Such a chief teacher could not be, in any true or effective sense, a head-teacher. The interposition of such an official between the actual working heads of those departments and the managers *would be fatal to the authority of those subordinate head-teachers, would greatly lessen their sense of responsibility, and would tend to neutralise that personal influence which a good head-teacher should have over his staff and his scholars.*"

There is much more in the same admirable educational strain; but *ex pede Herculem!* The present policy of the Board is obviously "No dummy or pseudo-head-teachers!" and "No barrack schools!" The Union's ideal may even yet be realised.

THE cold hand of Death has been inordinately busy amongst former members of the Executive during the past twelve months; and closely following the deeply-regretted demise of Mr. Wardale comes that of Mr. Frank Wheeler, the intelligence of whose "passing" came as a veritable shock to his hundreds of close personal friends all over the country. I forget exactly the number of years that he served as a member of the Executive, although the period was not inconsiderable. But Mr. Wheeler's value was not to be measured by days, and months, and years. A decade ago, when I was just beginning to "feel my feet"—to utilise an expressive colloquialism—at Russell Square, the division betwixt "board" and "voluntary" members was strongly marked—in fact, absurdly accentuated by the strenuous protagonists on each side of the house. Misunderstandings that might have almost been termed wilful were constantly arising, and there was a "crisis" of some description or other at practically every Executive meeting. It was ever Mr. Wheeler's endeavour to act as moderator between the contending parties, a part for which he was eminently fitted by the possession of sound common sense, broad views, liberal sympathies, and a keen appreciation of "the golden rule." He was singularly lacking in personal ambition, though he had every quality requisite for the highest offices. He was content to be useful, and retained to the last the confidence, esteem, and admiration of those who knew him best. After he retired from the Executive, Mr. Wheeler became a member of the "B. and O." Council, and, having attended its last meeting, may be literally stated to have "died in harness." On the board of the Educational Newspaper Company he did all that one man could to reconcile opposing factions—in my day, unhappily, without success. Of him it may truthfully be written: "He nothing common did, or mean."

Mr. F. F. Wheeler.

FOR some years past the demands on the general fund of the Union have been so many and varied that expenditure has exceeded income. The Llandudno Conference instructed the Executive to report as to the best method of dealing with this difficulty, and, in my humble judgment, a clear, concise, succinct document was presented twelve months later. This did not, however, satisfy the expensive creations euphoniously and euphemistically described as "examiners of accounts," and consequently the representatives at Scarborough were easily persuaded to order the Executive to do their work over again. By a clever and adroit amendment, an influential section who had attempted in vain (for years) to secure discussion on "reorganisation," tacked it on to the question of finance, and next induced Conference to appoint a "special meeting"—a kind of *imperium in imperio*—to consider both organisation and finance, and to report in 1907. Conference at once selected the President, Vice-President, ex-President, Treasurer, the examiners of accounts, and Messrs. H. M. Cohen, W. Carr, W. T. Crank, F. B. Gale, C. E. Hampton, R. B. Hancock, C. T. Milford, H. R. Morrell, T. M. Parry, H. E. Storey, R. A. Drake, E. C. Willmott, C. F. Vernon, C. T. Breary, A. S. Thomas, and T. T. Burkett, whilst *nine* members were to be elected "by and from the Executive." In accordance with this instruction, Messrs. Blackburn, Boulter, Coward, Croft, Goldstone, Hole, Pearson, Rankilor, and Sharples were chosen at the Executive's first meeting, the failure to include Mr. Marshall Jackman—a genius where "schemes" are to be either considered or formulated—being both

The "Special Meeting."

a surprise and a misfortune. The thoroughness with which every detail of Union expenditure was probed, and the determination to know "all about everything" on both sides of its balance-sheet, were beyond all praise, and I found myself continually marvelling at the stupendous energy and perseverance of certain of my colleagues.

* * *

THIS energy and perseverance did not, however, manifest itself in long sessions, for in both May and July the "special meeting" only lasted five hours. When it was recollected that the expenses for each meeting amounted to about £60, some of us began to think the Union was not receiving value for money; so in August and October three sessions were held instead of two, and the members assembled earlier and sat later than heretofore. Economy being the *mot d'ordre*, it was speedily discovered that the only item on which large savings could be effected was that of travelling expenses of members of the Executive, and the first important resolution agreed to was one stating that the "Executive should be materially reduced in number." The division upon this showed twenty-three for, three against, and three not voting. Writing from memory only, I believe the trio against reduction were all class-teachers, whose leaders have somehow come to the conclusion that a big Executive is necessary to carry on the Union's work effectively. If expenses are to be lessened, however, the number of the Executive *must* be cut down. Members were invited to suggest schemes for a smaller Executive, and as a result six schemes were submitted for consideration. My excellent friend Mr. Charles W. Hole had the honour of creating that finally adopted, and I hope to be able to congratulate him next Easter on its securing the *cachet* of Conference. Briefly, its provisions are—(*a*) England and Wales shall be divided into twelve electoral districts, and the associations affiliated to the Union shall be apportioned among those districts. (*b*) The Associations shall be apportioned among the districts in such a manner as the Executive may from time to time determine. The Executive shall have power to readjust the boundaries of contiguous electoral areas, from time to time, in accordance with the wishes of the constituent Associations. (*c*) The unit qualifying any area to have a member of the Executive shall be obtained by dividing the total membership of the N.U.T. by thirty-six. Each area shall have as many members as it has complete units. Those areas having the larger balance over the completed units shall be entitled to an extra member until the full number of thirty-six members is reached. The total of membership used in obtaining the unit shall be that published in the last annual report prior to the date of the election. (*d*) The present rules with regard to election and tenure of office of President, Vice-President, ex-President, and Treasurer shall be maintained, except that the ex-President shall hold office for one year only. This scheme shall come into effect for the Easter election of the Executive, 1908.

Its Recommendations.

* * *

UNDER the term "reorganisation," the special meeting, by vote, decided to include constitution of Conference, and in this connection propose what is little short of a revolution. They recommend that Rule 13 be amended as follows:—

Reorganisation.

"That each Association be permitted to send to Conference representatives according to the following scale:—

Membership not exceeding					100	2 representatives.
"	exceeding 100 and not exceeding				150	3 "
"	"	150	"	"	200	4 "
"	"	200	"	"	250	5 "
"	"	250	"	"	300	6 "

Membership exceeding 300, one additional representative for every 100 or part of 100."

Provision is also made in the rules for the presence of examiners of accounts, whilst a new and valuable suggestion is one to the effect "that one session of Conference be arranged so as to provide for sectional meetings." Under the heading "reorganisation," all sorts of impossible and ultra-expensive schemes were put forth, involving, *inter alia*, the creation of both Electoral Area Committees and a National Council; but they were ruthlessly cast aside, only some three or four hands being held up in their favour. The indefatigable Mr. C. E. Hampton had, however, the satisfaction of securing from the special meeting a pious opinion in favour of every Local Association becoming a constituent part of a County Association, in addition to a declaration that the powers and duties of the County Associations should be considerably enlarged. I am in thorough accord with the policy of making them responsible for the organisation of their area and the supply of deputations to ordinary Association meetings, but I am not greatly enamoured of the proposal to appoint a County Tenure Committee, even though its powers are circumscribed to the extent that it shall "work under the direction of the law officers of the Union," and shall only have referred to it "all tenure cases which, in the opinion of the Tenure Committee or the law officers of the Union, may be so remitted." Conference will be asked to sanction the reversion of the travelling and hotel expenses of the Executive to *out-of-pocket* disbursements, the present fixed scale being the upward limit. If this plan be accepted, I do hope that the bad old times of inuendo and insinuation will not be revived. I have no space to enumerate the minor reforms recommended, though, in their way, they are not unimportant.

* * *

THE following resolutions of the N.U.T. on the present position of the Education Bill were passed on December 8:—

The N.U.T. and the Bill.

"That the Executive of the N.U.T.—

"1. Deprecates the introduction of Parents' Committees in connection with the management of public elementary schools as being quite unnecessary; but if such committees are created, most strongly opposes placing in their hands any powers dealing with the appointment or dismissal of teachers, either in an advisory or any other capacity.

"2. Reaffirms the Union's position of supporting the abolition of all creed tests for teachers in public elementary schools, and most emphatically protests against the introduction, now and for the first time, of such tests for teachers in provided schools; it calls on his Majesty's Government to reject the Lords' amendment which creates them.

"3. Being firmly convinced that if the ordinary teachers of a school are allowed to give the denominational religious instruction, it will be impossible to secure the abolition of religious tests for teachers, strongly urges the Government to resist any amendment which will permit the teachers to volunteer their services for such instruction during ordinary school hours.

"4. Most strongly condemns the reintroduction of privately-managed schools into the public elementary education system in England and Wales, and urges his Majesty's Government to reject any proposal which will have the effect, under any circumstances, of allowing schools to receive public moneys while they contract out of public control." A. C.

NOTES FROM THE NORTH.

IN July last the Department issued a circular proposing an alteration in the date of the written portion of the Leaving Certificate Examination from June to Easter, and asking the school authorities for an expression of opinion on the change. The Department has now let it be known that an analysis of the communications received has brought out a remarkable diversity of view. Approval and disapproval balance one another almost exactly, and it is particularly striking to find that the cleavage is in no sense a local one. The difference, which is apparent over Scotland as a whole, is reproduced in much the same proportion in nearly every separate district. In the circumstance the Department think it would obviously be undesirable to carry into effect the change suggested. Accordingly in 1907 the written examination will be held in June as hitherto.

Change of Date of Leaving Certificate Examination.

WHILE the Department has thus agreed to take no action, it is not satisfied that the better decision has been come to; and it advises that those most intimately concerned might well give further consideration to the question. It is convinced of the soundness of the educational reasons underlying the proposal, and it fully anticipates that, on reflection, the force of these will be appreciated by not a few whose first impressions were altogether adverse. It therefore says additional representations will be carefully weighed if received before March 15, 1907. Some of the letters referring to the proposed change of date clearly show, the Department contends, that some misunderstanding has taken place. Almost without exception, the specific objections put forward are based on a fundamental misconception as to the relation in which the Leaving Certificate Examination ought to stand to the work of a school. The written papers, the value of which is incidental only, are too often regarded as things by themselves—a purely external test, the real function of which is to bring artificial pressure to bear on teachers for individual pupils, with the result that this portion of the examination inevitably tends to assume a greatly exaggerated importance.

The Department not Satisfied.

THE aim of the Department, as a matter of fact, says the Secretary of the Scotch Education Department, is so to organise the system as to secure both a thoroughly trustworthy record of a pupil's actual attainments in certain definite branches of study, and also a reasoned verdict on his general ability and on the manner in which he has acquitted himself all through his curriculum. Education should be looked upon as a continuous process, not merely as a preparation for recurrent annual examinations; and it is a grave mistake to suppose that, when the written examination of any one year is over, the pupil ought to throw aside his old studies and embark upon new. The absence of set books in the Leaving Certificate Examination is a great advantage from this point of view. With the co-operation of the school authorities, the realisation of this ideal ought not to prove impossible.

The Department's Ideal.

THE president (Mr. Thomas Adams, M.A., George Watson's College, Edinburgh) of the Association of Teachers in the Secondary Schools of Scotland, in the course of his retiring address, said the conditions under which inspectors in secondary schools carried on their duties were adverse to a true estimate of the teacher's work. A change in the spirit of inspection, however, had arisen. They had it on high authority that the trend of the Scotch Education Department was to make inspection more advisory and less dictatorial. If the inspector was to be a guiding light to the profession, the success of his visitation must depend more and more on the character and capacity of the adviser. It was a foregone conclusion that no respect would be shown to the suggestions of men who had only theoretical knowledge, or whose practical knowledge was confined to two or three years in a secondary school before their appointment to the inspectorate. They must be men of wide and varied experience. I regret that there are still indications that in Scotland we have not reached the stage when inspectors are chosen from the ranks of experienced teachers. Until the Department recognises that only from such men should the future inspectors be selected, the teaching profession of Scotland will look with disfavour on the inspectorate.

The Inspectorate.

LAST month I referred to the appointment of the Directors of Studies by the Provincial Committees of Edinburgh and St. Andrews. Glasgow has appointed to this position Mr. Donald M'Leod, M.A., rector of Hamilton Academy. Mr. M'Leod, who is a native of Rossshire, graduated at Edinburgh University with first-class honours in mental philosophy, and shortly after, in the competition for scholarships and fellowships, was placed first, and was awarded the Baxter scholarship of £240. He was also a Kant medallist, senior medallist in moral philosophy and in logic and metaphysics. He has resided at various times in leading Continental countries, and has made a careful study on the spot of the educational systems of France, Italy, Germany, and Scandinavia, more especially with reference to technical and manual training and the teaching of modern languages. His educational appointments cover a period of twenty-five years. After graduating at Oxford, he was, in 1885, appointed principal of Morningside College, Edinburgh. Four years later he became rector of Forfar Academy. From this position he became rector of Hamilton Academy in 1897. In connection with this academy he has organised a very large and successful evening school. His experience, therefore, fits him in an especial degree for his new work. Aberdeen has recommended Mr. George Smith, M.A., rector of the United Free Church Training College of that city, for the position of Director of Studies there. Mr. Smith, who is a distinguished graduate of Aberdeen University, was for a time assistant in Milne's Institution, Fochabers. He was afterwards headmaster of the

New Directors of Studies.

Gordon Schools, Huntly, and subsequently rector of Elgin Academy. He succeeded Mr. John Adams, now Professor of Education in London University, as rector of the United Free Church Training College, Aberdeen. Mr. Smith is a prominent member of the Educational Institute, and is a member of the General Committee of Management. For some years he was convener of the Institute's Higher Education Committee, and has taken an active part in that department of the Institute's work.

* * *

The Institute Congress.

THE Institute's Congress is this year to be held in Dundee—the home of the president—on January 3 and 4, 1907. Already the preparations are well advanced, and the committee in charge of the arrangements have issued their programme. The Right Hon. John Sinclair, M.P., Secretary of State for Scotland, has been secured to give an address. I believe this will be the first occasion on which a Cabinet Minister in office has addressed the Congress. It is a very clear indication of the growing power of the Institute. The venerable head of the St. Andrews University, Principal Donaldson, is to have the honorary degree of F.E.I.S. conferred upon him. Principal Donaldson was president of the Educational Institute in 1868. During the years intervening, he has evinced a deep interest in educational movements, and the conferring of the honorary degree is a fitting crown to his great work. Among the other speakers we note Principal Mackay, University College, Dundee; Professor Edgar, St. Andrews; and Mr. J. Macpherson Wattie, His Majesty's Inspector of Schools. The usual functions connected with Congress are all to be held, and we anticipate a highly successful gathering.

* * *

E.I.S. Doings.

THE Institute has at the present time many irons in the fire. Circulars have been sent down to the branches asking their opinion with regard to various points of educational and domestic policy. The Ladies' Committee are anxious to have the curriculum and the hours of the infant school and supplementary and continuation classes for girls thoroughly discussed during the present session. Both subjects are worthy of the careful attention of teachers at the present time, and no doubt the various replies to be given by the branches will prove of value to the Institute in forming a policy on these important questions. The question of the formation of a Provident and Dependents' Fund is also to receive the attention of the branches, and the committee in charge of this has issued a very exhaustive memorandum on the subject. Direct Parliamentary representation—as the result of a motion at the annual September meeting—has also been referred to the members. A circular has been prepared by the Parliamentary Committee of the Institute showing the cost of this very desirable object. This committee points out that it will require an addition of from 2s. to 4s. to the present subscription to secure a teachers' member. It is stated that a contested election will cost £2,000, and that £900 a year will be required to maintain a member in the House of Commons. The subscription to the Institute at the present time varies from 3s. 6d. to 5s. 6d. The amount that requires to be sent by the branches for each member to headquarters is 3s. 6d., of which 1s. is ear-marked for the Benevolent Fund of the Institute. Some associations charge their lady members 3s. 6d. a year, all of which they send to headquarters; others charge for these 4s., and in nearly every case 5s. or 6s. is charged for gentlemen. I am strongly of opinion that we are trying to run the Institute too much on the cheap. Aberdeen Association, I believe, asks a 5s. subscription from every member, whether lady or gentleman. Of this it sends 3s. 6d. to the Central Fund. It is about time that the members of the Institute were realising that if they are to do any effective work of this kind, or any other, there must be a larger subscription to headquarters. It is frugality carried to excess. Perhaps by raising the subscription there might be a falling off in the membership; but I am convinced that this falling-off would only be temporary. The Institute, as I have frequently said in these notes, has no local habitation; and until it secures permanent headquarters, it will never occupy in public estimation the position it ought to hold. All these schemes require money, and unless money is forthcoming the influence of the Institute is consequently restricted and rendered less effective. Salaries during recent years have made some advance, yet the subscription to the chief teachers' organisation of Scotland has remained stationary since it was instituted in 1847. No more fitting way of celebrating the Institute's diamond jubilee could be conceived than by the acquiring of headquarters in Edinburgh.

R. D.

DEPARTMENTAL CRITICISM.

THE following is taken from the report of the Board of Education already referred to:—

"Perhaps the most serious and most widespread defect in the schools inspected by the Board in the last eighteen months is the bad teaching of English. There is scarcely a report in which complaint is not made of the English teaching in one direction or another. Either the teachers are not qualified to teach it, or there is too little time given to the subject; there is too little attention given to reading, and the recitation books are not well-chosen; or they do not exist at all, for collections of extracts are *biblia abiblia*; or there is no instruction except in formal grammar; or, most frequently of all, there is no graduated course of study. The following extracts justify these serious strictures:—

> "'An attempt is being made' (at ——— Municipal School) 'to strengthen the teaching of the English subjects, and much zeal is shown by the masters dealing with them. Apart, however, from the question of time, further consideration should be given to the aim of such teaching and to its proper graduation and connection with other parts of the curriculum. There is a tendency at present to treat the English books as a matter for scansion, analysis, etc., and as a quarry for miscellaneous allusions, rather than as a means of culture and a training in logical expression. Some of the books studied are chosen deliberately from the former point of view.'

"Of ——— Grammar School the Inspector reports:—

> "'In the term when the school was inspected no literature whatever was being taught. The grammar lesson heard in Forms II. and I. was all but worthless. An unsuitable text-book was being dealt with mechanically; the boys, having no principles to guide them, made a series of bad guesses. It would be better for this class to drop grammar, and be taught instead to read and understand a simple poem or two.'

"The evils that follow from this are only too frequently apparent. The children are careless and faulty in speech, their answers are mumbled or inaudible, and as a further consequence the standard of work in French and German is low."

EDUCATION IN FOREIGN LANDS.

Germany.—We have just had the advantage of reading the verbatim report of the last Congress of the German Teachers' Union, which was held at Munich. The method of carrying on business is very different from our own; but in presentation of their case, in the intellectual treatment of subjects under discussion, and in the lofty ideal they take of education and of the duty of the educator, the leaders of the German Teachers' Union outshine, in our opinion, the chief men of our National Union of Teachers. The chief subjects of debate were the *Simultan-* or *Paritätische-Schule* and the question of women as teachers. The ordinary type of school in Germany is "confessional"—that is, restricted to one religious denomination. In the *Simultanschulen* children of all denominations would be taught together for secular subjects, but separated for religious instruction, teachers of varying faiths being appointed in proportion to the numbers of pupils of each denomination. In some small states of Germany *Simultanschulen* have existed for years, and the system works well; and where, as in Munich, *Simultanschulen* exist side by side with confessional schools, they are very popular. With the confessional school is bound up the domination of the pastor as local school inspector, and the substitution of lay inspectors trained in educational work for ecclesiastical supervisions is much to be wished. Then, again, many German teachers are striving to make the *Volkschule* the preparatory school for all classes of society, and the abolition of the confessional school would be a step in this direction. The *Simultanschule* would, it was also urged, make for national unity, by causing children of different faiths to associate together from an early age. Against this it was urged that in the *Simultanschule* religious differences would be more accentuated than in the confessional school by the separation of the children for religious instruction. It was also argued that the whole instruction in the *Simultanschule* could not be permeated by a religious tone as in the other class of school, and that nothing but a colourless treatment of some periods of history, such as the Reformation period, would be possible in it. The *Simultanschule* would lead to better organization of educational effort by stopping the multiplication of small schools in scattered districts. After several days' debate the congress accepted the idea of the *Simultanschule* with separate religious instruction, rejecting a motion from Hamburg and Bremen to organise such schools excluding the religious element.

The logic of events has made the question of women as teachers one of the burning topics in German educational circles to-day. It is generally held in Germany that the work of teaching should be entrusted to men only; and until comparatively recent years women teachers were almost unknown. In some states none are employed at the present day. They are chiefly employed now in the large towns, but nowhere on such a scale as in England. The increase of trade and manufactures in Germany which followed the establishment of the German Empire led to a diminution in the number of male candidates for the teacher's office, particularly in the large towns; while at the same time the tendencies which in England have led to women competing with men in occupations formerly closed to them manifested themselves. One result of this is that in great towns like Berlin and Hamburg a large proportion of teachers in the elementary schools are now women. To some extent these lady teachers come from higher social strata than the men, and they have had the influence of powerful connections behind them to give them a footing in the schools. Now in Prussia a larger proportion of male teachers than ever cannot find employment in the towns, and are compelled to take rural schools, the work in which—where, generally, one teacher has to cope with the varied requirements of the whole of the pupils—is admittedly too difficult for women. Men teachers, almost without exception, while admitting that the education of both sexes is the joint business of man and woman, urge that, whilst woman is almost entirely responsible for the training given to children before they are enrolled on the books of the school, the necessary complement to this feminine influence is to entrust the man alone with the training in school. It is impossible within our limits to go into the whole of the reasons, physical and psychological, adduced by the men to support their standpoint, but the question was raised at Munich by a series of resolutions submitted by Oberlehrer Laube of Chemnitz. After several days' debate the first resolution was adopted. It runs thus: "In appointing women as teachers in the public elementary schools, the interests of the schools, and not the need for opening new occupations to women, should be the determining consideration." The other resolutions fell through in consequence of lack of time to discuss them thoroughly.

Uruguay.—Teachers in the districts of Uruguay which border on Brazil have a special difficulty to contend with. Both the Portuguese and Spanish languages are spoken in these regions, and the purity of the Castilian idiom suffers from the admixture of Portuguese words. Señor Plaza, who has taught in succession two schools in this region, has used for twelve years an ingenious way of impressing upon his scholars the differences between the two cognate languages. He uses a large stone—one of that kind which is attached to an Indian *bolas*. A pupil who is detected using a Portuguese word is presented with the stone, which he has to keep until he finds a companion committing a similar fault to his own, whether in school, in the playground, or when the pupils are saddling their horses to go home. He may then relieve himself of it, and hand it on to his fellow-sinner. The unlucky possessor of the stone employs all his wit to make a comrade trip in his speech, and the rest of the school, put on their guard against his wiles, endeavour to speak their mother tongue without the faintest admixture of Portuguese. The weight of the stone in his pocket reminds the little culprit of his fault, and the fact that he cannot get anything out of his pocket to play with unless he first brings out the reminder of his offence makes him the keener to get rid of it. Lest he should regard the possession of the stone as a joke, he has to put in an extra half-hour in school each day so long as he remains in possession of it. Señor Plaza's idea is an ingenious one, and its effectiveness, which has stood the test of long experience, depends on the continually alert interest which it evokes amongst the pupils.

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POLAR EXPLORATION OF RECENT YEARS.

ESPECIALLY THE WORK OF NANSEN AND PEARY.

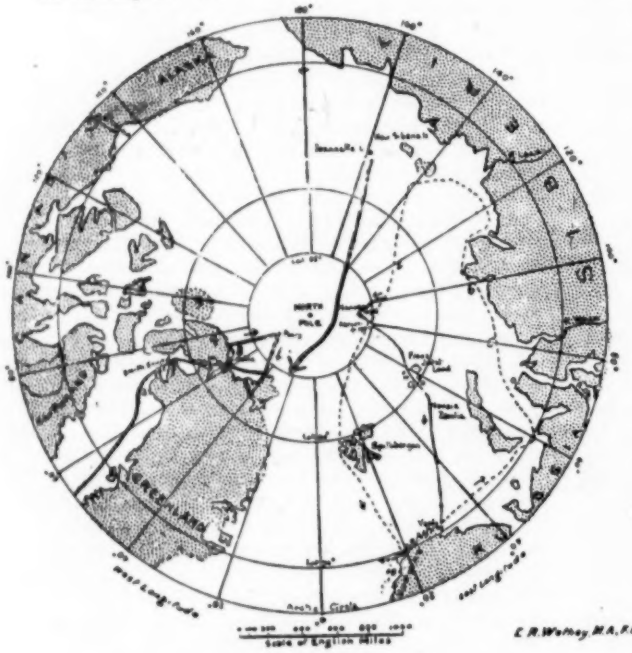
BY E. R. WETHEY, M.A., F.R.G.S., BRADFORD GRAMMAR SCHOOL.

THE recent news of Peary's great exploit in the "race for the North Pole" affords a suitable opportunity to review the more famous achievements since the Greely expedition of 1883 brought back the then record of 83° 24′ N. lat. We propose, therefore, to summarise briefly—(1) The chronology of the chief expeditions; (2) the work of Nansen in 1893-6; and (3) the work of Peary in 1905-6.

I.—Chronology.

(Numbers in square brackets refer to Map.)

1883. Greely (American). Lockwood reached lat. **83° 24′** in long. 40° W.



North Polar Regions.

Probable drift of *Jeannette* articles (which decided Nansen on his route), 1881-1884.
The voyage and drift of the *Fram*, 1893-1896.
The sledge and homeward journey of Nansen and Johansen, 1895.
Voyage of the *Roosevelt* and sledge journey (approximately) of Peary, 1905-1906.

Explanation of Figures.

Peary. 1. Whale Island. 2. Independence Bay. 3. C. York. 4. Grant Land.
Nansen. 5. Sverdrup I. 6. Nordenskjold Isles.
Peary. 7. Etah. 8. Cape Columbia. 9. New land (approximately).

1888. Nansen (Norwegian). Crossed Greenland from east to west in about lat. 64°.

1891-2. Peary (American). Crossed Greenland from west (Whale I. [1]) to east (Independence Bay [2]), ascertaining insular nature of Greenland, and deciding that the Pole could not be reached *overland*. Peary followed up this expedition by several others between 1893 and 1902, in one of which he brought back from Cape York [3] a great ironstone meteorite, weighing nearly a hundred tons. But beyond confirming his impression that the only way to reach the Pole was from either Grant Land [4] or Greenland by "sledge-dashes" across the Polar Ocean, he did not add much to his previous investigations. He discovered that the northern point of Greenland lay in lat. 83° 50′—that is, considerably farther than had been supposed—and he pushed his own record up to **84° 17′** (long. 70° W.) on April 21, 1902.

1893-6. **Nansen** (Norwegian). Sailed in the *Fram*; eventually reached lat. **86° 13′** about long. 90° E.

1894-7. Jackson-Harmsworth (British). In the *Windward*, reached lat. 81° 19½′, explored Franz Josef Land, and brought home Nansen.

1896-7. Sir Martin Conway (British). Explored Spitzbergen.

1897. Andrée (Swedish). Attempted a balloon voyage to the Pole, and perished in the attempt.

1899-1900. Duke of Abruzzi (Italian). In the *Stella Polare*, a Norwegian whaler, tried the Pole *via* Franz Josef Land. Captain Cagni, one of the officers, reached lat. **86° 33′** in long. 65° E.

1903-6. Amundsen (Norwegian). Nansen's old captain sailed the *Gjoa* from Kristiania to Cape Nome, and so achieved the North-West Passage.

1905-6. **Peary** (American). Sailed in the *Roosevelt*, and reached lat. **87° 6′**.

II.—Nansen's Work in 1893-6.

As long ago as 1869 a Swedish naturalist, Agardh, proved that driftwood in Spitzbergen must have come from Siberia. In 1884 articles belonging to the ill-fated *Jeannette* (sunk in 1881 to the north of the New Siberia Isles) were found on the south-west coast of Greenland. From this and other data Nansen (who had himself examined under the microscope mud found in the ice drifting down the east coast of Greenland, and had come to the conclusion that it was Siberian) conceived his great design of fitting out a specially-built ship, and of allowing himself to be frozen in the ice in the neighbourhood of the *Jeannette* catastrophe. By so doing he imagined that there was every chance of his ultimately drifting right across the North Pole. He carried out his plans, and how nearly they succeeded a glance at the map will show. He sailed in the famous *Fram* from Vardö, hugged the Siberian shore to about long. 140° E., and was frozen in eventually at the point on the map where his "drift" back to the west obviously begins. And thither he drifted three winters. Realising that he was slipping past the object of his expedition, he left the ship with one man, Johansen, and skiing over the ice, reached lat. 86° 13′ on April 7, 1895, or about 260 miles from the Pole. There he was compelled to turn back, eventually emerging in Franz Josef Land. Meanwhile the *Fram* had drifted steadily on, finally leaving the Polar zone at Spitzbergen. The story of Nansen's

meeting with the *Windward*, and his restoration to Europe by the Jackson-Harmsworth expedition simultaneously with the arrival of the *Fram*, is not the least interesting part of the whole adventure. The results of his work may be summed up as follows :—

1. He attained the farthest north of the time.

2. He discovered that north of the Franz Josef archipelago there was deep water, averaging two thousand fathoms, and extending probably to the Pole. Hitherto it was supposed that the Polar Sea was nowhere deeper than a hundred fathoms.

3. He found also that this water was relatively warm, with an upper layer of a hundred fathoms averaging 31°–32° F., and a lower layer of nowhere less than 33° F.

4. He found, too, that the maps of Franz Josef Land were wrong (not a surprising discovery !), and that there were several unmarked islands along the Siberian coast, notably one he called Sverdrup I. [5], and a group he named the Nordenskjold Isles [6].

5. And lastly, he established his opinion that there was a steady drift of ice from the American north-west corner to Greenland more or less across the Pole.* This ice is never still; the great ice-mantle which was supposed to cover the Pole does not exist, and therein lies the chief contrast with the Antarctic region.

III.—Peary's Work in 1905-6.

For information as to Lieutenant Peary's expedition and its work we are at the time of writing dependent almost entirely on cablegrams from Labrador and Newfoundland, but enough has come through to enable us to gain a tolerably satisfactory notion of what he has done.

He left New York in the *Roosevelt* in July 1905 with a crew largely composed of Newfoundlanders. He passed Ungava Bay in August, and sailed on to Etah [7], the most northerly settlement of Eskimo in the world, and always one of his favourite bases. There he engaged seventy guides and a hundred dogs. September saw his ship frozen up, nor was she released until the following summer. He wintered on the north coast of Grant Land [4], near the *Alert's* famous winter quarters, where he and his men regaled themselves on musk ox and reindeer, trout and salmon. As soon as spring—save the mark ! he had experiences of storms with the thermometer at 75° below zero in *summer !*—showed signs of appearing, he marched for the north *via* Capes Hekla and Columbia [8]. He took with him five supporting parties, with instructions to remain fifty miles apart. Incidentally this part of his plan seems to have failed, and so far from their assisting him, he had himself to rescue two of his parties from an untimely end. Eventually he reached lat. 87° 6′ (in about long. 60°, as far as we can judge at present), over ice which was steadily drifting east—ice evidently making for the great Atlantic gap to join Nansen's westerly flow. There he left a bottle with his record—just about two hundred miles from the Pole—and some flags, including a piece of one he had carried round North Greenland six years before. Returning, and still drifting east on the ice, he reached the north coast of Greenland once more. He had had to eat all but three of his dogs, and burn his sledges for firewood. His adventures on some of the young icefloes were as thrilling as they well could be ; but, finally, he retraced his steps safely to his ship —all well. Not a man was lost, though one, Mr. J. Clarke, who had been in command of one of the supporting parties and had lost himself, was rescued when within an ace of starvation. Altogether Peary had been away from the *Roosevelt* 117 days. After recuperating, he sledged west, completing the north coast of Grant Land. He discovered new land about long. 100° [9], to locate which on the map we must wait for further intelligence. Then he turned home once more, down Smith Sound, against incessant storms and winds, until he reached Hopedale (Labrador), buffeted and almost wrecked, without coal, and compelled to burn some of his ship's fittings and seal blubber for fuel. He sailed into Newfoundland waters on November 20, and so ended his eventful journey.

Summarising his work we find that—

1. He has attained the highest latitude hitherto known.

2. He has found that there is open water even up to and beyond lat. 87°.

3. He has discovered a new archipelago (west of Grant Land) much farther north than was ever suspected before.

4. Just as Nansen found all the ice north of Siberia steadily drifting *west*, so Peary found it north of America as consistently drifting *east*.

It is questionable whether much really new information will come from Peary's latest work. For one thing, he does not appear to have taken any sounding apparatus with him in his dash for the Pole, which was the more unfortunate as he met with open water so far north, and one wants to know how far Nansen's deep ocean extends, and whether it really does cover the whole Polar basin. Peary, however, is undaunted yet, and says this is only the prelude to another attempt. Only he adds that he does not intend to adopt Nansen's "drift" plan. The theory is right enough —that is, from the north-west corner of America—but any one to carry it out must have a temperament which can stand imprisonment in the ice several years. He has not this temperament. He is still of opinion that if the North Pole is to be reached at all, it must be by the Smith Sound route and by sledge-dashes, but he is prepared to try an air-ship, "if a suitable one can be made !" And a man who in pursuit of his goal has already lost eight of his toes by amputation after frostbite is entitled to be listened to in all departments of Arctic exploration !

* A comparatively recent corroboration of Nansen's view that this ice is continually drifting across the Pole and making for Greenland and the Atlantic gap is seen in the case of a cask which was left on an icefloe northwest of Port Barrow (Alaska) on September 13, 1899, and came ashore on the north coast of Iceland on June 7 1905.

THE BOARD OF EDUCATION AND MUSIC IN SECONDARY SCHOOLS.

BY DR. W. G. M'NAUGHT.

IN view of the leaps and strides made by music as a factor in the life of the community during the last twenty years or so, the treatment of the art as an educational subject in middle-class school curricula cannot be considered as adequate or satisfactory. Not but that some excellent results have been achieved in quarters where the heads of schools have realised the importance of the part music may play in the wholesome development of the young, and the right of a child to have its inborn faculties explored. But such results have been sporadic. Happily they serve as object lessons as to what can be done in the conditions of the type

of school under consideration. It must be confessed that musical study is severely handicapped in the average secondary school, if only because it has been regarded, even by the highest educational authorities who rule the roost, as a negligible subject, or, at most, as one that may be tolerated as an occasional mild recreation, and as serving to provide a more or less melancholy term-end entertainment or prize distribution. Results even of the highest order have been completely ignored in the only examinations secondary schools have been plied to prepare for. Hence the line of least resistance for the teachers has been to agree, blandly and exoterically, that music was a very fine thing indeed, and at the same time to take care esoterically that it was not permitted to stand in the way of the bread-and-butter subjects upon the results of the examination in which the whole public reputation of the school was built. This statement of an inexorable situation is not intended to be censorious on head-teachers. They have, as a class, to meet the demands of the authorities over them, and to go with the tide of public opinion or the exigent demands of parents, who gauge by the results of examinations. Until these forces combine to demand a reassessment of the value of music in the whole scheme of education, it would be unreasonable to expect school authorities to effect reforms. Now, it is gratifying to note that the signs of the times distinctly indicate a growing appreciation of the potentialities of musical training. British parents are becoming aware that, with all the ado there is about music in their social life, there is an inconvenient hiatus in their educational equipment. But more notable still is the attitude of the Board of Education to "Music in Secondary Schools," as evinced by the important circular bearing this title issued towards the end of November last. It is very much to be hoped that this document will receive the attention it deserves from all concerned in the schools to which it appeals. No doubt there is much in the circular, both as to form and substance, to provoke criticism, but when all is said under these heads, it must be acknowledged that the earnest spirit which permeates all the arguments and recommendations put forward entitles it to the most respectful consideration.

The circular is divided into twenty-five paragraphs, each with its topical head. Naturally, the "Place of Music as an Educational Subject" comes first. After remarking that, although many head-teachers are convinced of the educational value of music, they have not a clear idea of the nature of the benefits to be derived, the Board says :—

"The effect of music and of kindred subjects on character, and on the development of general intellectual power, not being capable of assessment by examination, the teaching of it is apt to resolve itself into the training of fingers or voice; while the really important side of the subject—that which appeals to the higher emotions, awakens the imagination, and cultivates rhythmic sensitiveness in a child—is neglected."

Then follows a somewhat awe-inspiring paragraph, the ideas in which might have been expressed more simply :—

"Music is related to a consciousness which has expressed itself variously in all nations, at all times, and through all the rhythmic arts (of song, poetry, dancing, design, sculpture, painting, and instrumental music). Its true function begins at a point where words, intellectually apprehended, have no place—even when, as in poetry, words are the vehicle of emotional expression. The primary appeal of the rhythmic arts is through the senses to the subconscious mind, and their educational office is to develop imaginative power. Imagination harmonises the facts, relations, and processes which are dealt with in the intellectual training of the conscious mind."

It will be observed that design, sculpture, and painting are classed as rhythmic arts.

It is stated that "it is impossible to overestimate the educational value of a thorough training in musical rhythm—the simplest concrete means whereby sensitiveness to the rhythmic order in individual thought, and action, and power for communal action may be educed." Here, again, there is much to try to understand. Surely the claim that the educational value of a training in rhythm cannot be overestimated is fanciful and exaggerated.

Under the head of "Result to be Aimed at" it is stated that

"the truly educational treatment of music in early years should aim at developing the capacity for response to artistic expression in *all* children. All should be trained *how to listen*—not by verbal explanations, but by a method which slowly forms a standard. In this matter, perhaps more thoroughly than in any other, experience is more valuable than precept. From the artistic point of view, it is pernicious to tell a child, whose artistic sense is being developed, that any particular work of art is greater or better than any other. The endeavour should be so to habituate them to what is good, of however simple a kind, that they gradually become aware of relative values for themselves, thus giving them a mass of concrete experience to which in later years they can refer, for understanding and confirmation of the canons of intellectual discrimination and criticism in matters literary and artistic."

There is a good deal of asking for the moon in all this, but still it reads impressively.

As to the important matter of the time to be spent over class teaching of singing, it is suggested that from twenty to thirty minutes a day should be given to children from the ages of seven to thirteen. This is a liberal allowance, and, it may be feared, more than the subject will ordinarily get.

The difficult problem of boys in preparatory schools is briefly touched upon. It is said that

"in the case of boys whose parents insist on, or permit, the learning of an instrument, real hardship is inflicted by taking the time for both lessons and practice out of play-time. It is found quite necessary to do this in girls' schools up to the age of seventeen, even where there is considerable pressure for examination work."

The last sentence was puzzling, but it turns out that "necessary" should be "unnecessary." This invidious comparison of girls' and boys' preparatory schools leaves out of consideration the fact that the best of the boys' schools have to cram their pupils for public school scholarship examinations, in which music does not count; whereas girls, as a rule, have no such career before them. If the boys' public schools sincerely desire preparatory schools to give more attention to music, they have only to say that musical ability will count at the entrance examinations, and all the junior schools will be eager to deal adequately with the subject.

After saying very pertinently that

"it is important that theory and practice should go hand in hand, and that a general system of nomenclature and method should be decided upon in large schools by all the teachers of harmony, instrumental music, and class singing,"

"class teaching" is dealt with specifically, although all the previous paragraphs have implied such collective teaching. First, the kind of music to be sung is discussed. It is stated that

"it is generally recognised that the traditional song literature of a nation is the natural foundation on which musical culture should be based. Such songs are the true classics of the people, and their survival, some of them by oral tradition alone, shows that their appeal is direct and lasting. These are being largely used in the elementary schools, and the use of them in secondary schools would tend to form a minimum common basis of national

music in all classes. The use of dance music of a vulgar character for these purposes is greatly to be deprecated."

It is probably owing to a recent discussion as to what really constitutes a "folk" song that the word "traditional" is used. There is no doubt of the desirability of some suitable songs of this character being taught to school children, but it should be recognised that the great majority of "folk" and "traditional" songs are wholly unfitted for school use.

Voice production is dealt with on somewhat controversial lines. It is quite right to recommend the practice of downward scales in the early stages of training, and the general cultivation of unstrained, easy delivery. All this is safe, provided the result is not feeble and flat. But the whole paragraph on the topic might induce readers to presume that all high notes are easy and safe practice, and that only low notes are injurious. Whereas the facts of experience are that the practice of high notes is often most painfully injurious to young voices. It would be easier to prove that many more children's voices have been permanently disabled by efforts to sing high than low pitches. The following are the paragraphs in full relating to this important topic :—

"It is of the utmost importance that little children should be trained to sing sweetly and without strain. Children can sing *quietly* more easily in the right than in the wrong way.

"Children who drone, or who cannot sing in tune, should be made to listen. These non-singers should be weeded out of the class, and grouped in the front, to listen only. Their voices should be tried from time to time, and, as the power of singing develops (as will occur in a great majority of cases), they may be allowed to sing with the rest. The few children who are eventually found to be tone-deaf should not sing at all.

"Children are sometimes apt to form the highly injurious habit of using the lower, or chest register. If they attempt to sing an ascending scale in this register it will be noticed that the voices break at about C^1 or D^1, and the rest of the passage will be sung in the head voice. This is, in both sexes, the true child voice, the sweet, mellow quality of which is familiar in well-trained choir boys. A short daily practice of a few minutes will suffice to secure the use of a right tone, if the following rule is observed. Let the class start on a note high enough to be quite out of the chest register (D^1, E^1 flat, or E^1), and let the children sing in this head voice a descending scale or passage, using the vowel sound of the word "On" (the Italian "O"), the object being to draw down the head voice as far as possible. Quiet, slow practice of a few such exercises will give a pure and beautiful tone, and will preserve the voices against the time they break.

"The best authorities hold that practically no child has a natural alto voice, though the actual compass of voices varies to some extent.

"The exclusive use, therefore, of the lower register in childhood is positively injurious to the adult voice."

Boys sometimes strain the "chest" register, but even in bad cases they could hardly possibly carry this so-called register up to D^1, and not one girl in a hundred would ever attempt such a feat.

The paragraphs on sight-singing are remarkable for the tribute they pay to the tonic sol-fa method of teaching. The following are quotations :—

"The best results have hitherto been obtained by teaching the staff notation through the tonic sol-fa method.

"The value of the root principles of this method—namely, the "Movable *Doh*" and teaching the "Mental Effect" of each note of the scale in relation to the keynote—can hardly be exaggerated. The system of teaching time is also excellent, based as it is, not on an intellectual arithmetical learning of time and accent, but on the sense impression given by the pattering sound of certain monosyllabic names for notes of different values, the combining of which imitates the pattern of the musical phrase. Power to read in staff notation should be kept in view all the time, every step in the tonic sol-fa followed by the corresponding step on the staff. The tonic sol-fa alone, unrelated, until an advanced stage, to the staff, tends to induce laziness in learning the universal notation; and no pupil can be considered a good reader until the syllable *Lah* can be used instead of the sol-fa syllables, in both notations.

"Very musical teachers are often inclined to dispense with the tonic sol-fa aid. They have picked up the sight-singing by means of playing an instrument, and cannot realise that every interval has not a definite mental effect as it has always had for themselves. The work of children trained by such teachers, if carefully tested, will generally be found to be a more or less successful system of guessing. The early stages of sight-singing, taught through the sol-fa, do not require great musical gifts in the teacher."

The ensuing paragraph has a special interest because the system condemned has been recently the subject of a propaganda in secondary schools for girls :—

"The system of teaching sight-singing by means of figures is to be deprecated. It transgresses fundamental laws of psychology—for example, the same set of symbols are used for totally different purposes, simultaneously and often in apparent contradiction, so that the teacher, counting time, may say 1, 2, 3, 4, while the class, naming notes, sings 4, 3, 2, 1."

The idea of using the figures as the names of the seven degrees of the scale is very old. The figures are also the basis of the French Galin-Paris-Cheve Method; but in this case they are called by their sol-fa names (1 = *do*, 2 = *re*, 3 = *mi*, etc.). The advantage claimed for the figures when they are applied to the staff notation is that, because of the well-known consecution of the numbers, it is easier to find the number of a note than its sol-fa name, the surroundings of which have to be memorised. But there are objections in addition to those pointed out in the circular. The nomenclature of the minor mode is vague and confusing, and the names for sharps and flats (sharp-four, flat-seven, etc.) are clumsy and tend to obscure rhythm.

For the kindergarten, English, French, and German nursery rhyme and game songs are recommended. These are said to be usually preferable to modern action songs. It is said that

"children can pass on to the easier traditional songs, the value and pleasure of which are in no way lessened by imperfect understanding of the words.

"It is a mistake to teach little children only songs the words of which it is supposed they will understand. It is the spirit of the song which appeals to the spirit of the child, not the words to the brain."

Ear-training is recommended as soon as the notes (degrees of the scale) in relation to the keynote have been mastered. Rest for the voice is enjoined during "the change from childhood to adolescence." Girls' class singing has a long, special paragraph. It is pointed out, in reference to the use of part-music, that composers have "never had occasion to study the limitations of immature voices," and that, therefore, great care must be exercised in the choice of part-music for girls. This is a sweeping statement. Many very good musicians have applied their powers to writing part-music for the young. It is very well stated that

"the aim of the singing-class should not be fine performances so much as a steady advance in musical culture, practice, and perfecting of sight-reading, and ear-training, and sweetness of voice production. This last is a sure test as to whether the voices are being legitimately used."

The remainder of the circular deals with individual teaching in the form of instrumental music. It is claimed that such teaching is greatly assisted when the pupil comes from the singing-class with the ear and understanding trained. Among the recommendations, we are told that

"no child should be allowed to begin to play on the piano till he can name notes, on a large diagram of the great stave, in the

treble and bass clefs, as easily as he can read the letters of the alphabet; nor should he play from the printed music till he can rapidly play named notes on the keyboard.

"Beginners on the piano are often asked to perform five mental and physical actions at once, while two or three of these are only imperfectly mastered. This is destructive of brain power. It is not necessary to employ a highly-trained instrumentalist at this stage. But it is of the first importance that the teacher should have thoroughly mastered a good method."

Sight-reading should form a part of every lesson. Musical form, transposition, and elementary harmony should form parts of the course. Some brief "general hints" bring the circular to a conclusion.

The advice and suggestions issued by the Board a year or two ago for the elementary schools included the sketch of a graded course for singing-classes, with illustrations. No such syllabus is issued with the new circular.

It must be the fervent hope of all musical educationists that this effort on the part of the Board of Education will meet with encouraging response.

RUDYARD KIPLING AS A TEACHER OF HISTORY.*

BY J. GUNN, M.A., D.SC.

IT was really Shakespeare's fault, if fault there was. He was not content with interpreting human nature; the field was too narrow. So he had to fall back on other materials—the fairies among the rest—in order to find scope for his imaginings. Imaginings is not the right word, however. We used to think that Puck and Titania and Oberon and the rest of them were merely creations of Shakespeare's exuberant fancy, but we see now that they are more than this: they are real, historical persons, just like Henry the Eighth, and Macbeth, and Hamlet, and Prospero. And they even have an advantage over those merely human personages: they have an immortality which is more than literary; and under suitable conditions they—or one of them at least—may be induced to revisit the glimpses of the moon, and there, which is more to the purpose, a "tale unfold."

The suitable conditions, as Kipling tells us, were these: Dan and Una had learned to act the fairy scenes in the *Midsummer Night's Dream*, and by chance chose for a rehearsal a time and a place of special fitness—the time being the evening of Midsummer Day, and the place a certain old fairy ring in a certain charming old English meadow. We need feel no surprise at the result. Puck, the sole remaining resident in England of the troop of fairies whom Shakespeare knew so well, is induced to appear in visible form to grace a performance so much to his mind. The wonder is that no one had induced him to appear before, it all seems so very natural now!

Puck seems to have changed very little since Shakespeare's time; and though he claims to be the Oldest Thing in England, he is very much at home with the young English boy and girl—things which are fairly old too, and have changed but little in all the English centuries. In token of friendship the children "take seizin" of the meadow from Puck, and are thenceforward seized and possessed of all Old England. "You shall see What you shall see, and you shall hear What you shall hear, though It shall have happened three thousand year." The promise does not seem to commit Puck to anything very definite, but it is a promise which is royally fulfilled.

The first Old English happening deals with the days of the Norsemen, and their smith-god, later known as Weland. Evil days fell upon Weland, and it was a very long time before he was set free to join his kindred in Valhalla, leaving behind him a sword worthy of his craft.

On Puck's second appearance he is accompanied by Sir Richard Dalyngridge, who came over with Duke William, and has a fine story to tell of his experiences on the very ground where the children sat—a tale of right good chivalry, well worth the trouble of his coming back to tell. The sword of Weland comes into the story too, for the story of Old England is one, though written in many chapters.

A second time Sir Richard appears, and in the story of "The Joyous Venture" he recalls his share in one of those strange voyages of old, when the Englishman, half pirate and half Crusader, with the mingling motives of glory, duty, and reward, began to feel his way towards the lordship of the sea. The mental state of the early discoverers when they first faced the wonders of Africa is very well pictured.

Then comes a tale of Sir Richard's old age, when the quarrels between the Conqueror's sons divided men into hostile parties. It is a tale of plot and counterplot, but the interest never flags, and the old knight is able to give a good account of himself, to overturn the schemes of his enemies, and to maintain peace in his time within his own domain.

On Puck's next appearance he has a different comrade to introduce—a "young man covered with hoopy bronze armour.....a great bronze helmet with a red horse-tail that flicked in the wind." This is Parnesius, a centurion of the Seventh Cohort of the Thirtieth Legion, the Ulpia Victrix—a Roman, of course, but one who had never seen Rome—a native of the Isle of Wight, in fact. He compares notes with Una as to governesses and other things common to many ages, and gives a fine picture of his entry into military service.

Then comes the best thing among all the good things which Puck reveals of Old England—the story he makes Parnesius tell of the defence of the Great Wall when the power of Rome was on the wane. It is Roman, of course; Kipling is a master of local colour; but it has all the vividness and go of the tale of a frontier war on the borders of our Indian Empire. The tale is continued in "The Winged Hats," the Danish or Norse invaders, who swooped down upon the England which Rome could no longer guard. The three tales of Parnesius form one connected narrative, and give such a picture of Roman England as we have not seen equalled, and cannot hope to see surpassed.

Sir Harry Dawe, otherwise Hal o' the Draft, is next introduced, and has a merry tale to tell of the more modern times of Old England, when Oxford colleges were being built, and guns were being cast for the king's ships under Sebastian Cabot, while stout Sir Andrew Barton demonstrated the need for them.

Then we come to Reformation times; but Puck confines himself to giving only one aspect of the change—its effects upon the fairy folk. For them England was no longer a congenial home; hence the great

* *Puck of Pook's Hill.* By RUDYARD KIPLING. Macmillan and Co.

"Dymchurch Flit," when they managed to take boat and cross the Channel for good, Puck alone remaining.

Finally we are treated to a scene from the times of Magna Charta, which gives an instructive vision of the secret forces at work in high places—"The Treasure and the Law"—from which we gather that the want of treasure may be a wholesome influence in the making of laws.

Sandwiched between the stories Kipling has given us a series of songs or poems, several of which are gems, notably some verses of "The Children's Song," which has been widely quoted since it appeared.

The whole book is treasure-trove for our young people. Kipling has, in the person of Puck, done what every teacher of history is trying to do daily—made our Young England free of Old England, and given them "seizin" of the happenings which have made England what it is to-day. He has, of course, given only a few fragments, but he has shown the true method of the teacher.

Incidentally he has used—perhaps we should say he has invented—a new 'form" of educative literature. We have already the historical novel or tale; Kipling has given us the historical "short story." This is a different thing, and for the young a much more effective thing. The mind of the reader receives a complete picture in small compass, without the distraction of a complex plot, and without the disadvantage of requiring many days' reading to complete the unity. In this way he well justifies the title we have attached to this notice. He has become a true teacher of history, and he has shown how the work may be done by others. We cannot imagine a book better fitted at once to make a boy understand his country and to love it.

RHYTHM AND REASON.

A GOOD book is a blessing, and when that book happens, as in this case, to be devoted to the interests of our youngest children—those who may reasonably expect to have many days before them—it becomes a treasure.

The writer must, first of all, be considered, for the *heart* of the book is the soul of its author.

A Rhythmic Approach to Mathematics * is the work of Mrs. Edith L. Somervell, the wife of Dr. Somervell, well known to all recently-trained teachers as the director and examiner of music in the training colleges. But what is of more importance than this is the fact that Mrs. Somervell knows the capacities of the minds of little ones, and how to rouse their interests in their work. She does this in a perfectly natural way, for she is sympathetic in her tone and language, and that is saying of her what all teachers should desire to be themselves. Her first note is struck in her dedication of the book—"Dedicated to those who shall come after, in memory of those who have gone before." It is charming and sweet, and could only come from a teacher of the highest and noblest instincts.

The preface, which perhaps we ought to have read last, is from the pen of Mrs. Mary Everest Boole, and in it she explains the origin and purport of the book—to draw attention to the fact that there is a connection between the laws of thought and the laws of form; and to show how the knowledge of it, as far as she was concerned, came about. It is interesting enough to quote from, but that pleasure we will not take from those who may procure the book. It is best read there.

It must be said now that *A Rhythmic Approach to Mathematics* is a course of lessons in embroidery intended for our very young children, even for those who have not yet left the nursery. Consequently, the book is of use in our baby-rooms. Seven sets of cards entitled "Boole Curve-Sewing Cards" are published to go with the book, and by their use most beautiful designs can be executed. Our illustration, Fig. 1, shows what may be done by using the nonagon, which is Card 5 in the Fifth Series. This illustration—and, indeed, all the illustrations in *A Rhythmic Approach*—is reproduced from a pupil's own work. Much is said in the book of "curves of pursuit," and it is by means of such curves that the type-form of the *violaceæ* seen in the illustration has been evolved step by step in the design. The outline of the nonagon is on one side of the card; where the work is done with needle and silk

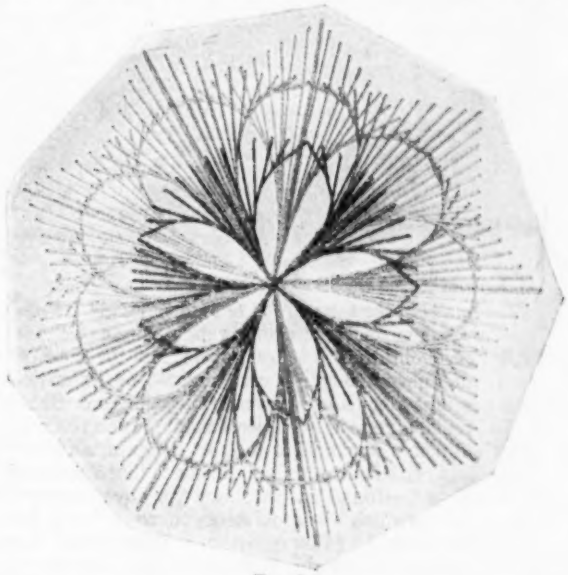


FIG. 1.

the pattern comes out on the other; and we can well imagine the joy and the delight of the little worker as she finds, by turning over from time to time, what she is producing.

The chapter on colour is very sensible, and there is evidence in it that the authoress is out and out unselfish. She has produced—or rather her pupils have produced—some excellent blends of colour, and she takes pains to describe most minutely how these shades may be obtained. She would like those who use the book to achieve as effective work as her own pupils have done. Mrs. Somervell is an advocate for colour-growth in children, and teachers who have given this subject any consideration must agree with her. "Let the pupils," says she, "use only the darker or medium shades at first. The gems and the rainbow set the standard in its simplest perfection, and if the children are allowed to use and 'play' with these freely, the more subtle and complex combinations suggested by themselves later will have the brightness of fine Oriental work." This chapter is illustrated by six most charming pieces of work in colour, the combinations and tints of which

* *A Rhythmic Approach to Mathematics.* By EDITH L. SOMERVELL. London: George Philip and Son, Ltd.

are worthy of being the work of older minds and hands than those of the little ones who have done them. It would be thought so; but Mrs. Somervell concludes

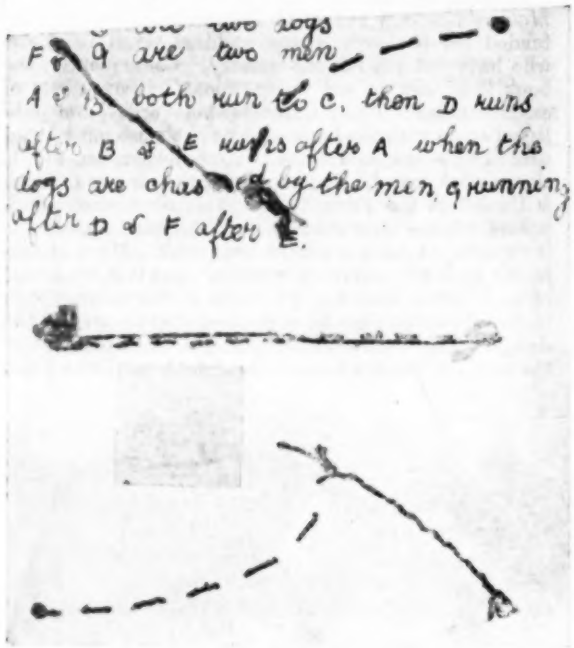

two dogs
F & G are two men
A & B both run to C, then D runs
after B & E runs after A when the
dogs are chased by the men & running
after D & F after E.

Fig. 2.

the colour chapter thus: "It should be made an absolute rule, when once the colour range has been chosen, to allow the children to select quite freely for their own work, and never to guide and suggest or to criticise their combinations, however crude they may be. Should a child make a very ugly choice, let him finish the work, and then a few weeks later look at it again, and see if he has any criticism to make. There is interest and instruction to be found in watching the development of colour-sense, which is astonishing to those who have not experimented in this direction. Most adults have not developed this freely, and are more or less tied up by conventional rules or degraded taste produced by early familiarity with bad colour, and the children's combinations are freer, bolder, and more correct in tone than those which ordinary adults would venture on."

There follows now a short chapter on the use of the cards, and no teacher should fail to understand the principles, especially if reference be made to the cards, a complete list of which is given on the fly-leaf and cover at the end of the book.

A specimen lesson is now given—or, rather, two lessons are sketched. They are for the most part in question and answer form, and Figs. 2 and 2*a* are copied from the work of one of the pupils. In the first lesson a pretty "rabbit and dog" story is used as the basis, and in the second the parabola is brought in by means of "ball play." In referring to the parabola, the use of which term we do not gather that Mrs. Somervell suggests for the children, some experimental work is employed. "Teachers who are accustomed to 'ball drill' can demonstrate the identity of the parabola with the curve of a rising and falling ball by drawing a parabola on a blackboard, and throwing a white ball close against the board at such an angle and with such an impetus that the children can *see* the ball taking the same course (curve) as that drawn on the board." This teaching is *true* teaching. Work is done unexpectedly out of play, and during its evolution the mind of the child is expanded and made capable of greater understanding. Lesson II. is full of suggestions which a teacher will not fail to make the most of. It is rich in its educative power. It is in these suggested lessons that the *approach to mathematics* is seen, for the designs become unwittingly geometric. The preface contains the following statement with regard to this point: "Some of the work produced was shown by Mr. Garstang, mathematical master at Bedales, at the house of Dr. Somervell, and the connection between harmonograph curves and those shown was pointed out. Hence the *rhythmic approach*."

Next the circle is treated. Here the child is again taught by observation. "Children can produce the caustic curve, which they can look at in a teacup, made by refraction of light, etc." There are some very pretty and effective designs built up, too, on the system of the spiral of Archimedes, and the cards in the Sixth Series are devoted to this section. There are combinations of what is called the tractory curve—a curve produced by following a certain track or path—and the spiral, on which some capital advice is added by Miss Eleanor Cobham, who has interested herself in this system of teaching.

As regards Fig. 3, we may say that it is produced entirely by means of straight lines drawn with the rule. It is a design suitable for many decorative purposes. The publishers, indeed, have made use of it on the front page of the book, where, entwined with the title, it at once suggests rhythm, harmony, and geometry. At first sight it would seem hardly possible for straight

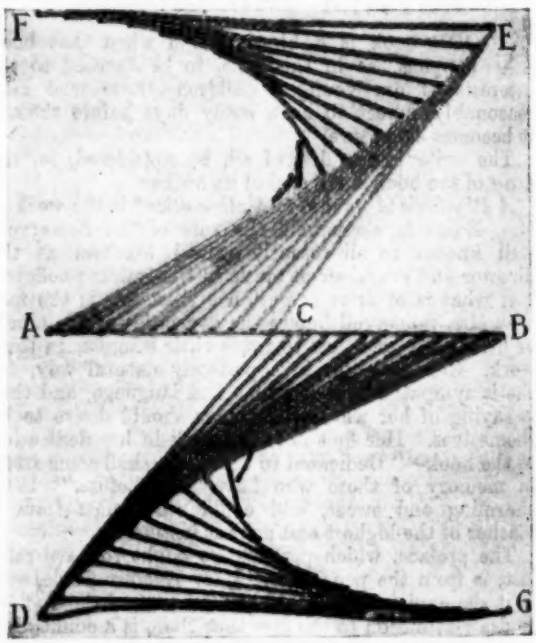


Fig. 2*a*.

lines to produce such effects; but a careful examination of them affords sufficient evidence of the fact

that such can be done. We see in the book and its teaching very great possibilities, and we feel sure that in the hands of careful and studious teachers—teachers who will lend themselves to experiments in regard to their professional work—it will "set little children, with their abundant leisure and fearless

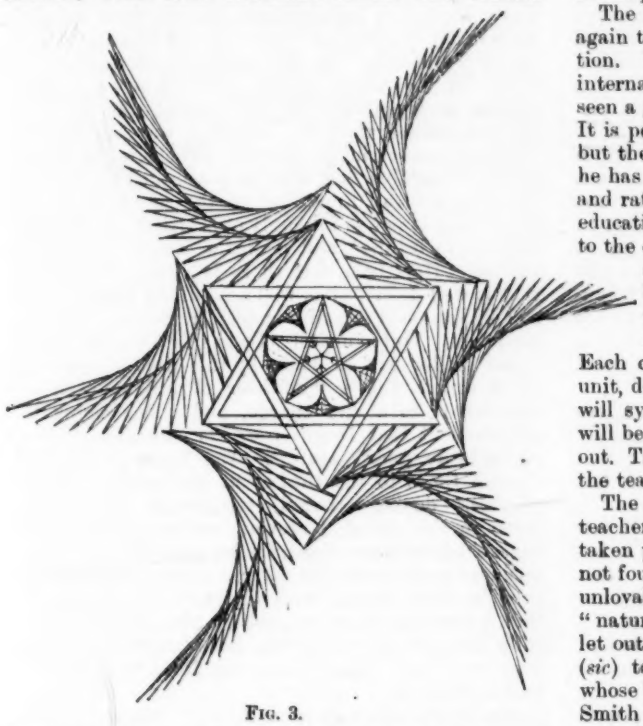


FIG. 3.

ignorance, safely exploring the wonderland of beauty hitherto reserved for thinkers and mathematicians."

It has been by the kindness and the courtesy of the publishers that we have been able to illustrate our review of what we may safely and justly call this wonderful little book.

FOUND WANTING.

THE Globe Library, published by Messrs. Rand, M'Nally and Co. of Chicago and New York, is content with paper covers. The volumes are most commonly encountered at railway stations, from which we may gather a general idea that their contents are not of the heaviest. They profess to entertain rather than instruct. But there are exceptions; at any rate there is an exception. This is Vol. 128, which bears the title, *The Evolution of Dodd*. Among the stacks of volumes of the Globe Library that burdened the grimy bookstall in the gruesome subterranean North-Western Railroad depot at Chicago, Dodd stood out as something quite different from his fellows. I cannot remember whether he cost me two shillings or three—I rather think two—but, in any case, he was worth the money, if for nothing else than the indication he gives of the widespread interest education claims in the States. Can we imagine an English publisher daring enough to bring out a railway book with the sub-title *A Pedagogical Story*? Yet Dodd was evidently popular. He occurred in rather greater numbers than did his rivals, mostly of the sensational detective class. This may have been because he is chronicled in the most recent volume of the Library; but this cannot be determined from the volume itself, which gives no more indication of the date of publication than it does of the price.

The writer is Mr. William Hawley Smith. But again the volume declines to give any further information. We have to take him as we find him. From internal evidence it may be safely assumed that he has seen a good deal of the inside of all classes of schools. It is perhaps too much to infer that he is a teacher, but there is little danger in hazarding the guess that he has "kept school." In any case he likes children, and rather dislikes teachers. As is usual in books on education, the destructive criticism is out of proportion to the constructive part of the work. In fact, the constructive work must be done mainly by the reader himself. The aim of the book is to condemn what Mr. Smith takes pleasure in calling "the machine." His is the gospel of individualism. Each child must be treated as a new and interesting unit, demanding a system all to himself. Most teachers will sympathise with Mr. Smith's aspirations, and it will be with a sigh that the impossibilities are pointed out. The author of the *Evolution of Dodd* is on the side the teacher wants to win.

The book is a veritable rogues' gallery of inefficient teachers. Sixteen are mentioned by name as having taken part in evolving Dodd, and only two of them are not found wanting. Dodd's first teacher was a certain unlovable creature, Miss Elvira Stone, who, though she "naturally despised children," went to St. Louis, "and let out the job of being fashioned into a Kindergarten (*sic*) to certain persons who dwelt in that city, and whose business it was to do just this sort of thing." Mr. Smith does not like the St. Louis School of Philosophy, and points out with some satisfaction that it has made no provision for dealing with little boys who poke mud off one boot with the toe of the other. Esther Tracy, on the other hand, knew exactly what to do; for Mr. Smith tells us, with all the emphasis of an exclamation point, "Esther Tracy, aged seven, who had never heard of a Theory and Art of Teaching, and who scarce knew her letters indeed, has put to shame Miss Elvira Stone, the hand-made disciple of Froebel and the St. Louis Kindergarten System! She knew what to do with Dodd, and Miss Stone didn't." No kindergartner need worry over the failure of the system to make a genuine teacher out of a lady who says with her lips to the unfortunate Dodd, "My dear little child," and with her heart, in Mr. Smith's words, "Drat the little villain."

It is significant that Dodd's first real educational gain comes from a man who is not a professional teacher at all—his grandpa Stebbins. There is quite a heroic scene, in which the main elements are a vinegar barrel, a spigot, a fleeing Dodd with spigot in hand, a flowing waste of vinegar, and an angry old man with a thong of leather. Corporal punishment is justified of its results on Dodd.

The next teacher is Amos Waughops (pronounced *Wops*), whose sole qualification for the office of teacher is that he is a cripple. It is true that he has a flow of language, as is illustrated in the incident in which he gratifies his personal spleen against Dodd. Asked to explain the words "leaned against the tree," Dodd confesses his inability, and challenges Amos to ex-

plain them himself. The cripple promptly gives the rendering, "assumed a recumbent position ag'in the tree." To the boy's criticism that this is less plain than the original, Amos replies by flying into a passion and calling him "a little devil." Dodd disappears, and this ends his second experience "in the legalised lottery of licensed school teachers." In connection with Waughops, Mr. Smith gives a lurid picture of the mode of appointing the teacher of a country school, and illustrates his argument by quoting from the examination paper of "a *bona fide* candidate for a certificate on the 16th day of December in the year of grace 1875." The answer is appalling, so Mr. Smith adds: "If any one thinks this an unnatural picture, please address, stamp enclosed, any one of the one hundred and two county superintendents of schools in Illinois; and if you don't get what you want to know, then try Iowa, or Ohio, or Pennsylvania, or even the old Bay State." It is only fair to add that the beginning salary for Amos was £4 a month, which is not quite the same thing, be it remembered, as £48 a year: the American teacher has often the dignity of paying for his holidays.

At this stage hard fate gives Dodd a respite. There is an oasis of four months, during which he is perfectly happy under the wise management of an Irish girl of eighteen. Amy Kelly was only fairly educated, but she had spent two winters at a State Normal School. Her first business was to scrub out in person her filthy schoolroom, and by enlisting Dodd as her assistant in this work she earned his lasting loyalty. This part forms pleasant reading, and Mr. Smith need not have troubled to say, "Don't turn up your noses, my dears, because this girl came from a very humble and unpretentious Irish family." It is the last thing his readers would think of doing.

Up to this point Mr. Smith has been dealing with human beings. However unamiable Miss Stone and Amos are, they are at least individuals. But now the book turns abstract. The names become significant. The name *Miss Stone* was suspicious. But *Waughops* and *Kelly* are reasonable names that occur in real life. The next pictures in the gallery are all carefully labelled. There are Miss Spinacher, firm and bony, Miss Slack, Miss Trotter, Mr. Skimpole, Mr. Loosely; then they taper off into a mere list of Messrs. Rattler and Striker, and Bluffer and Smiley. One or two are allowed to stand out a little, in order to illustrate some weakness that annoys Mr. Smith. Mr. Sliman, the great anti-whisperer, believes in the self-reporting system that Mr. Smith considers to be a direct incentive to lying. He drops into apostrophe, and forces us to compare Mr. Sliman with Mr. M'Choakumchild. Mr. Sharp is an attendance expert, and Mr. Smith ruthlessly exposes the method adopted to produce an appearance of perfect attendance and punctuality at the expense of the pupils' uprightness. Old Mrs. Heighton is introduced to illustrate municipal corruption, as she is a broken-down gentlewoman who is provided with a place for which she is quite unfitted. She is "a proud beggar on public charity," and gets £11 a month in order that she may keep her inane daughter Amanda in purposeful idleness that may lead to a prosperous marriage. Amy Kelly, by the way, had to be content with £5 a month.

One would think that this array of teachers was enough for one small boy. But Mr. Smith tells us that these are only samples. It is true that he does not even name the others, but slumps them in a general statement, and leaps to the time when Dodd, now seventeen, is taken in hand by Mr. Charles Bright. It was inevitable that this type should appear, but Mr. Smith does his best to make the admirable teacher an individual. Details are given. He was a Methodist Episcopalian; he was little and thin; he was fairly educated, but no great scholar; he was called "professor" by his patrons, and despised the title; he was about thirty years of age; even his weight is given—he did not exceed 120 lbs. By instinct rather than by following any method Mr. Bright hits unerringly upon the right thing to do with Dodd (though his first success is attained by what the books would call appealing to the motor sense—for psychology is not so intensely unpractical as Mr. Smith appears to believe), and makes a complete change in the lad. It is true that there is a temporary relapse that is well described as well as skilfully treated. But so long as Dodd remains under Mr. Bright everything goes well. Unfortunately, Dodd's father—the experienced reader has no doubt by this time guessed that Dodd senior was a "minister of religion"—is now transferred to a city charge, and then begins that easy descent that Dodd's previous education has done so little to guard against. The leading points are "seven times to the theatre in one week," "gaming devices," doubt, atheism, temporary "conversion." Even in this slough, however, Dodd is useful in pointing an educational moral, for he goes to one of those business academies that after a three months' course provide their alumni with diplomas that annoy Mr. Smith and the business public. Mr. Bright is naturally the god in the car who, not altogether in a conventional way, whips the erring Dodd back into the paths of virtue.

Mr. Smith can hold himself in no longer. He has been writing a novel—a novel with a purpose, it is true, but still a novel. The strain is too much for him. He drops the tale, and makes a direct appeal to the audience that he apparently has had in view most of the time. Priding himself on having spared the reader a Preface, he blossoms out into certain Addenda that he has the grace to say are "For School Teachers Only." Not that he has been reserved throughout the book. Indeed his modes of addressing his readers are varied and curious. Now he is stiff and proper, and his readers are "ladies and gentlemen," but this is rare; again he is very intimate, and unblushingly uses the now familiar book-of-essays endearment "beloved." Often he is sarcastic: "you fastidious ones," "dear devotee at the shrine of Grube, or brother Harris," "O infidel or orthodox." Occasionally he is patronising: "good people," "good folks," "kind friends." In the Addenda Mr. Smith comes out into the open with his "last word regarding the public school, for whose sake all this has been set down." He is not very hopeful, or even helpful, in regard to details. After speaking of the two methods of moral instruction—the awful example of the evil, and the attractiveness of the good—he says, "Which of these ways is the better, Heaven only knows, and has never revealed." This is surely needlessly pessimistic. So with regard to "the machine" when addressing teachers. It is different when the audience is administrative officers. But most teachers can read the following with unwrung withers: "The machine is built on the theory that the pupils are made for the

schools, rather than the schools for the pupils, and that the order of the grades must be maintained, no matter what becomes of the graded. What is it to this great mill if the pupils do fall out of the hopper? So long as the mill grinds, and the grinders can hold their places at the crank; so long as they can draw their pay, escape public censure, dodge behind a stack of examination papers when individual complaints appear, shield themselves from responsibilities by records and marks, keep the promotions in order, graduate a class a year in good clothes and with pretty speeches, see each of those who have been ground through go out into the great world armed with a diploma tied up with a blue ribbon, and so following—so long as the machine can do all this, what is the use of paying any attention to 'Dodd' Weaver and such incorrigibles as he, who refuse to go into the mill and be ground?" We wish Mr. Smith God-speed in his fight against the machine, and for the individual. In England we are fighting the same fight under a simpler name when we worry the administrative authorities to give us smaller classes.

SOME ECONOMIC PROBLEMS.*

MR. W. R. LAWSON has contributed many scholarly and stimulating works on economic questions, including such diverse problems as those of Spain and America, London County Council Finance and the Bank of England, and Higher Commercial Education in England. His *British Economics*, recently revised and brought up to date, is fully worthy of his previous works. It is clear, lucid, thorough, independent in tone, and free from political hysterics, though bound to be furiously attacked by doctrinaire professors of political economy. The author insists that the economic problem, which for this country transcends all others, is how to regenerate an industrial system that is steadily sapping our moral as well as our financial strength. He discusses "the twin scandals of overtaxed capital and unemployable labour," and "the complacent shortsightedness which considers that letting things slide is the only statesmanship."

Teachers and administrators should weigh well the following paragraph:—

"That blessed word 'co-ordination,' with which political and educational phrasemongers make such free play, is quite as much needed in some other spheres as it is in theirs. Nowhere is there such a fine field for it as in our staple industries. From top to bottom they call for improved co-ordination, close union between the capitalist, the employer, and the workman. The United Kingdom is overrun with moneyed people looking for safe investments and seldom finding them; with banks holding hundreds of millions of deposits, only a fraction of which they employ for the development of domestic trade; with inventors full of clever ideas, and financiers bursting with brilliant schemes, which no bank will lend them a copper to carry out; with manufacturers struggling under a load of rates, taxes, and foreign tariffs; *and with unskilled workmen who have learned just enough at school to unfit them for the proper use of either their hands or their heads.* In a properly co-ordinated system of national industry all these factors would be working harmoniously together."

Mr. Lawson holds that though we had not relegated economics to the planet Saturn, as Mr. Gladstone advised, the subject had, until the recent rude awakening, become almost a negligible quantity in political life.

Citizenship, with all that the term implies, is still little understood of the common people. If we read him aright, Mr. Lawson maintains that the stability of the British Empire depends for its foundation upon the masses understanding intelligently those principles which govern the association of human beings with each other, and he would begin with the schools.

He remarks that Germany did not go into electioneering hysterics half a century ago over big and little loaves, and attributes it to the fact that the general public had been gradually educated in social and political economics, much more than that the prestige of Prince Bismark was thrown into the scale which favoured the development of home industries rather than buying in the cheapest market, even when that policy closed the home markets.

From lack of economic training one party in England virtually speaks a language foreign and unintelligible to the other. One glories in the immense volume of our imports, while the opposite party regards this as a sign that we are living on our capital; one party is alarmed and one encouraged by the increase of income tax assessment; and so on. Also in assessing national wealth there is much confusion of thought on wealth of commodities, on money, on credit, and on earning power. The truth wants driving home as to "producers" and "parasites," the ideal of "earning" and that of "eating." As Mr. Lawson puts it in one place—

"In the balance-sheet of a nation there should be only two kinds of wealth recognised—solid property and personal capacity. Every person who renders honest service to his fellows, in however humble a sphere, is entitled to appear on the credit side of it; while every waster, loafer, and mere spender should be entered as a debit. The surplus of producers over wasters will be the national wealth of the country at a given date."

The author has a great deal to say about what he calls "statistical Aladdins," from which we gather that a very flickering light is cast from their wonderful lamps; for instance, the totals from which our income tax assessments are calculated represent not income alone, but income and expenditure; the same money may one day be workmen's wages, one day the tradesman's profit, the next in the bank till, and the day after back again in the hands of the employer of labour; and the wealth of the State is only to be measured by "the surplus of permanent benefit that remains when the balance has been struck between income and expenditure," not by the "rule of thumb methods" of Sir Robert Giffen and the Income Tax Commissioners.

As to ideals of national well-being, Mr. Lawson says:—

"As yet we have not got beyond the millionaire standard, the most vulgar and uninteresting that could be devised. Even our chief statisticians are theoretical millionaires; they worship figurative millions."

To turn to a perhaps more popular phase of British economics, the status of the industrial population, the author deplores the lack of patriotic and intelligent study of the great industrial revolution we have passed through in the last sixty years, and that on which we are now entering.

In discussing the fate of the displaced labour of the past sixty years he gives the "prosperity politicians" much food for thought in their study of the unemployed and unemployable, labour colonies, and the like.

As an example of the number of people ministering to mere spending, as distinct from producing, we learn

* *British Economics in 1904.* By W. R. LAWSON. Second Edition. Revised. Blackwood and Sons.

that "nearly half of all the men, women, and children with definite occupations are engaged either in cooking, dressmaking, waiting, shopkeeping, or building."

Mr. Lawson's point apparently is that a nation that tries to live by the distribution of wealth is about as logical as people attempting to exist by taking in each other's washing.

Of course economic optimists may argue that in a progressive and prosperous country the leisured classes should be continually growing. But they will not find it so easy to explain away the violent changes in the distribution of labour which have accompanied the relative decline in productive activity, such as in mining and the textile industries. The most striking decrease, however, is that which has taken place in the agricultural industry, the basis of all production, which suffered between 1851 and 1901 the enormous diminution in labourers of nearly one half. Mr. Lawson says, "History has no parallel to such a gigantic collapse in a vital branch of industry," and, moreover, that in any country but our own it would be investigated and discussed as a "portentous danger to the commonwealth."

It is here that Mr. Lawson seems to us to be on the strongest ground. What made England in the past was the building up of our great woollen industries, and the development of our mines and quarries, which again gave an immense stimulus to our manufactures. It is a poor consolation to find at the present time that the greatest increases in employment have taken place in such semi-parasitic industries as hotels, restaurants, A.B.C.'s, and music-halls.

SCHOOL JOURNEY UP THE THAMES TO HAMPTON COURT.

BY R. J. FINCH,
Hornsey Higher Elementary School.

(Illustrated from Photographs by A. Carr.)

THE "school journey" occupies an important place in the scheme of instruction in geography at the Hornsey Higher Elementary School, and a series of journeys has been arranged to provide practical and observational work in this subject from the very commencement of the junior course to its close. Each journey fills its own particular niche in the scheme, and has for its object definite concrete illustration and amplification of the work done in class, which has been arranged in sections, each with a school journey or practical work as its culminating point.

The journey to Hampton Court had for its object the study of the gradual metamorphosis in the character of a great commercial river as its higher reaches are approached. A previous excursion down the river to Woolwich had provided excellent opportunities for the study of the Thames as the "harbour of the nations," the river of commerce, of manufactures, of finance. Both journeys afforded ample facilities for impressing on the children the historical associations and grand traditions of the "royal river" and the buildings on its banks, so that, though in the main geographical, the excursions were also of great interest to the scholars from a purely historical standpoint.

There was at first some little difficulty in arranging for our voyage. The London County Council steamers do not run far up-stream; and though quite recently the Thames Steamboat Company ran boats to Hampton Court, the trip appears to be practically the monopoly of the "Queens of the River" Steamer Company, whose saloon steamer, the *Queen Elizabeth*, was the only vessel that made the journey daily. An interview with the manager resulted in the quotation of special fares and a promise to call at Blackfriars Pier for our party. We were somewhat surprised to find that, owing to the strong, low ebb-tides and the lack of water in the upper reaches of the river, we should probably have very little time for the careful study of Hampton Court Palace, so we arranged to make a special journey thither soon after, as a "history lesson out of school," which may form the subject of a future article.

As soon as the necessary details were finally arranged, the usual preliminary notice was posted on the class notice-boards, and the customary course of special preparatory lessons commenced. A comprehensive series of lantern slides had been used in the class lessons on the Thames, and these proved excellent preparation for the expedition. Each scholar was provided with a cyclostyled "guide book" for use on the journey. The "guides" were distributed a week beforehand, so that all might have ample time to study them. Each copy had been stitched and bound by the girls in stout brown paper covers as soon as the boys had printed off the sheets. The book consisted of sixteen pages, which were arranged as follows:—

Page 1.—Title-page and instructions.

Page 2.—Topographical map of the Thames Valley from Blackfriars to Molesey Lock.

Page 3.—Brief historical notes on towns and villages of interest.

Pages 4, 5, 6, 7, 10, 11.—Guides to the river in six sections—namely, Blackfriars to Victoria Bridge, thence to Putney, thence to Kew, thence to Richmond, thence to Teddington, thence to Molesey.

Pages 8 and 9.—Full plan of Hampton Court Palace and Grounds.

Pages 12 and 13.—Historical notes on the Palace.

Page 14.—Plan of the State Apartments.

Page 15.—Brief notes on plan on page 14.

Page 16.—General rules for the journey.

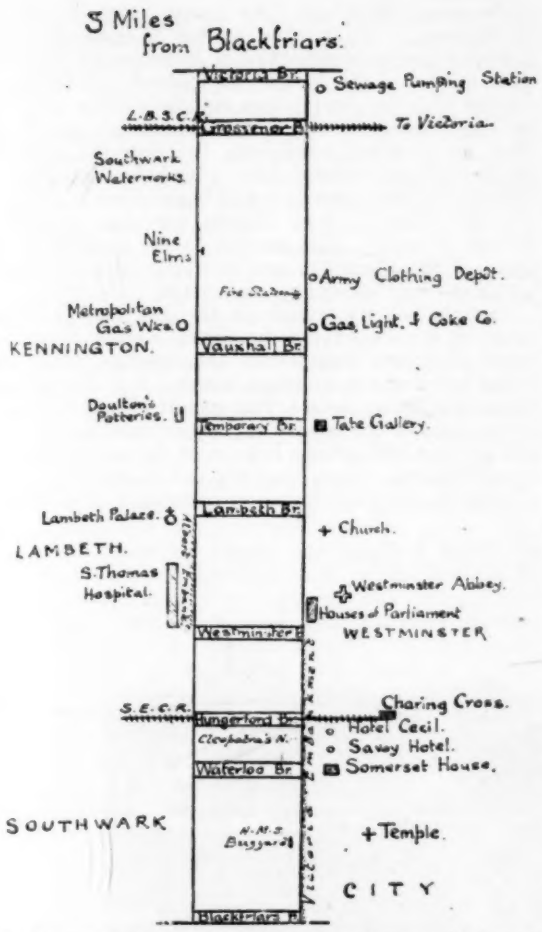
Owing to the difficulty of showing the necessary details on actual maps on account of the winding of the stream, the guide sections were arranged diagrammatically as below.

The total cost of the journey per scholar was under two shillings:—

	s.	d.
Return rail fare from Harringay to Farringdon Street	0	2½
Steamer fare	1	3
Tea	0	5
Total	1	10½

Each scholar took lunch. Tea was provided at Hampton Court by arrangement with a local caterer.

On the afternoon preceding the day of the journey the scholars, under the teacher's guidance, went over the route as shown in their maps and guide books, and a special lesson was given on the Thames Conservancy, and the means adopted for the regulation of the traffic on the river. Next morning about seventy scholars found their way in various local trains to the rendezvous at Finsbury Park Station, whence all took train for Farringdon Street, where we arrived at about 9.30 a.m. Much against our wishes, we were obliged to organise a march from the station to Blackfriars Pier, owing



to the crowded condition of the city streets, which were thronged, as they always are at that hour, with busy workers hurrying off to their day's toil.

Imagine us now assembled on the landing-stage beneath the shadow of Blackfriars Bridge, watching the strong ebb-tide swirling and foaming round the piers, and the ceaseless stream of craft of all sorts and sizes. Overshadowing us on our left is the railway viaduct of the South-Eastern and Chatham Railway, whence the hollow roar and rumble of a passing train drowns for a brief space the steady drone of busy traffic on the bridge. A discussion between some of the scholars and the teacher on the force of the current and the amount of matter it is carrying in suspension is brought to an untimely end by the approach of one of the London County Council steamers, as, with shearing stem and squattering paddles, she dashes in to make her usual call at the pier. Then comes the *Queen Elizabeth*, on which we are to make our journey. All are soon safely aboard, and each secures a seat or some other point of vantage whence all the sights may be seen. Once in midstream above the bridge, we begin the business of the day. The children's attention is first directed to the grimy warehouses on the right bank of the river, where giant cranes jut obtrusively from the grimy walls, and lift into narrow openings great bales of goods, which dangle perilously in mid-air over the stevedores at work in barge and lighter below. On the left bank runs the fine Victoria Embankment, which, in 1870, took the place of the unsightly mudbanks which formerly bordered the river at this point. The scholars soon turn from their scrutiny of the massive walls, and are absorbed in the interested examination of the naval volunteer gunboat *Buzzard*, moored opposite the Temple. Waterloo Bridge, the grandest in London, and, according to the great sculptor Canova, the finest in the world, affords the scholars a means of estimating the width of the river at this stage of the journey. On our right rises the solid mass of Somerset House, on the site of a palace which Protector Somerset began to erect in 1549. Before it was completed, however, he had suffered the extreme penalty, and the building fell to the crown, to be occupied in succession by Anne of Denmark, Henrietta Maria, and Catharine of Braganza. Above Waterloo Bridge the long stretch of the embankment is broken by the graceful obelisk Cleopatra's "Needle," with its guard of bronze sphinxes. This is hailed as an old friend, for the scholars in their ancient history course have devoted much time to its careful study. Attention is directed to the fine hotels which line the river bank, and some very good reasons for their present situation are given by the children. Next the vessel slowly steams beneath Hungerford Viaduct, over which trains run to and from Charing Cross, and a splendid view of the Houses of Parliament and Westminster Abbey is obtained. All have visited these historic buildings, so there is little claim on the teachers for information concerning them. Opposite, above Westminster Bridge, and fronting the Albert Embankment, rises St. Thomas's Hospital, on the verandas of which we see some of the patients who have passed through their term of suffering, and now, as convalescents, sit or recline in the warm sun. As we approach Lambeth Suspension Bridge, an interesting discussion arises on bridges, their structure, and value; and the light, graceful appearance of the suspension bridge is contrasted with that of the heavier arched bridges and the misshapen ugliness of the piered railway viaducts. On the south side of the bridge rise the crenelated towers of Lambeth Palace, which, for nearly seven centuries, has been the London residence of the Archbishops of Canterbury. We recall its history, especially its occupancy by Archbishop Laud, when it was stormed by the infuriated soldiers and people; and the Lollards' Tower, in which recalcitrant heretics were imprisoned and tortured in the fifteenth century, is pointed out. The tall, quaintly-built chimney of Doulton's Potteries now rises before us, and scholars are reminded of the reasons for its present location by the crowd of lighters and barges lining the shore. On the left bank stands the Tate Gallery, on the site of the old Millbank Penitentiary.

The scholars next turn their attention to the river craft, and delight in airing the knowledge gained on the previous river journey, by pointing out the various types and calculating relative speeds and carrying power. The slow progress of our steamer gives rise to some misgivings, for all are aware that at least twenty miles have to be traversed before our destination is reached. In answer to many queries the scholars are told that, although the *Queen Elizabeth* is steaming only four knots an hour, she could easily run twelve; but if the vessel ran at full speed she would reach Kew Bridge at low tide, and would have to wait there a couple of hours until the water had again risen sufficiently to allow her to proceed to Richmond Lock.

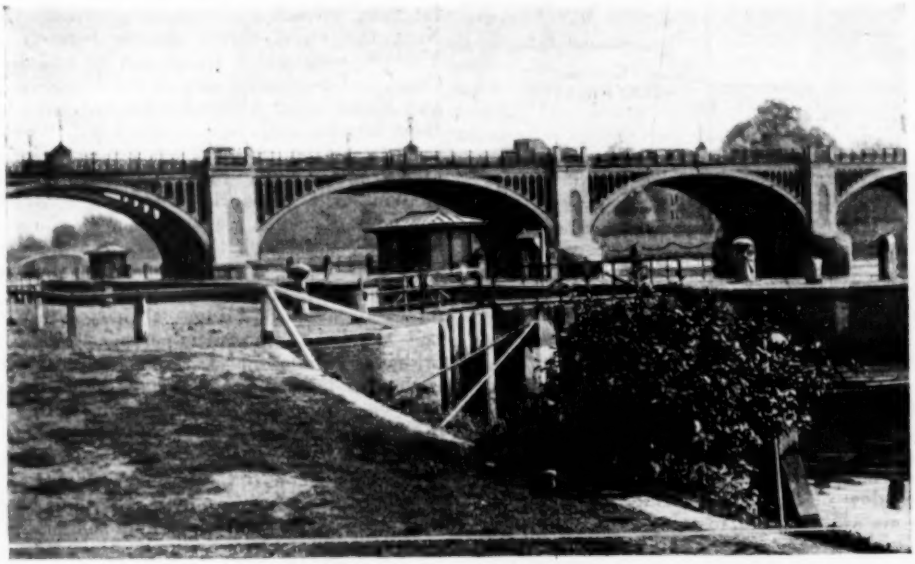
By the time this is fully explained we have passed Vauxhall and Grosvenor Bridges, and notice the change in the character of the stream and of the buildings that line its banks. Water works, sewage works, gas works, and factories of various types have taken the place of the stately hotels and historic buildings of the embanked Thames. Moreover, there is more foreshore, and mudbanks stretch far out into the stream. Beyond Victoria Bridge these disappear, and Battersea Park on the right bank and the houses of Chelsea on the left are seen.

At the stroke of midday we pass beneath Putney Bridge, and note yet another and greater change in the appearance of the stream. On our left runs the tow-path, with its hotels, boat-houses, and boatbuilding yards; on the right the Fulham Palace public gardens. Long, light, swift racing-craft and a launch or two proclaim the beginning of the Thames of the pleasure-seeker. London is now completely left behind, and lies hid beneath its pall of smoke.

Farther on, the rustling willows fringing the tow-path, and the tall white poplars which overshadow it, give a pleasantly peaceful aspect to the broad stream as it glides on towards the busy hive of industry from which we have just emerged. Below the bordering osiers the ebb of the tide has revealed a curious and expeditious method of protecting the tow-path from the action of the heavy "wash" raised by passing steamers. At low tide large bags of cement have been piled up to form a wall, and have become hard as stone on the rise of the flood, forming an excellent embankment. As we glide beneath the handsome suspension bridge at Hammersmith, and are discussing the university boat races, recalled to our minds by this part of the river, our conversation is interrupted by four sonorous blasts from the whistle of a tug which lies right across our bows with four deeply-laden lighters trailing out astern. We slow down in response to her signal, which is interpreted to the scholars as meaning, "I am turning round, and cannot get out of your way." This gives rise to a chat on the various signals in use on the river by day and night.

Chiswick "Eyot" or "Ait" next forms the centre of interest. It is the first on the Thames, and the teacher seizes the opportunity of driving home previous class lessons on the formation of islands in the lower courses of rivers, and points out the shallow channel (at this state of the tide almost dry) which cuts it off from the mainland, explaining, too, how the roots of the thick clumps of osiers help to bind the soil together. This island was formerly much bigger than it is now, but the "wash" from passing tugs has gradually gnawed it away. This has led to the embanking of many of the aits up-stream, especially those on which hotels and boathouses have been built.

Past the ait we notice on the left bank a long range of low-arched iron buildings, whence issue the sound of mighty hammerings and raspings, which increase in volume as we steam nearer. It is the famous shipyard of Messrs. John J. Thornycroft and Co., Limited, where some of our fastest war vessels have been built, and all gaze with intense interest at the unpretentious, grimy buildings, where busy brains and hands are ever at work to maintain Britain's sovereignty of the seas.



Richmond Lock and Foot-Bridge.

We are fortunate enough to see lying off the works the newly-launched coastal destroyer *Gadfly*, the first to be completed of the five ordered from Thornycroft's as part of last year's naval programme; and as we pass, the scholars crowd to the side to view at close quarters one of the "hornets of the sea." As we leave Chiswick astern, the children are reminded of the significance attached by the teacher in a previous geography lesson to the withdrawal from Thames-side of the famous shipbuilders, Messrs. Yarrow, and are told that Messrs. Thornycroft now employ about half the number of hands they did a few years ago. This leads to an animated discussion on the advantages and disadvantages of the situation of the Chiswick industry.

Opposite the "Ship" at Mortlake the Oxford and Cambridge winning-post excites a good deal of interest. As the vessel passes under the London and South-Western Railway bridge above Mortlake we notice an ait fortified against the tide-wash by cement and granite

armour, and cutting the river into two channels. We take the one on the left, and slowly pass over the shallows to the open river beyond and the landing-stage at Kew, where we hear the disconcerting news that the water is too shallow for further advance, and that a wait of at least thirty minutes is inevitable. A brief consultation with the captain results in the conclusion that it would be possible for our party to leave the boat at Kew, walk along the tow-path to Richmond Lock, and there re-embark. Accordingly we set out, all quite ready for a walk after the forced inaction of the past three hours. Behind the thickly-wooded aits across the river lies Brentford, where the little Brent from the uplands of the northern heights falls into the Thames. Brentford is remembered as the chief town of the middle Saxons at the "ford of the Brent," and the teacher supplies the information that it has twice been the site of a battle—in 1016, when Edmund Ironside defeated the Danes, and in 1642, when the Royalists under Prince Rupert won a doubtful battle against Cromwell's forces. Beside the tow-path runs the boundary of the famous Kew Gardens, and glimpses of their rare beauty are seen from time to time as we walk along. We suddenly stop in our march to watch the tactics of a pair of herons wading in the shallows of the opposite side of the river; but not for long, for, with a few leisurely flaps of their gray-blue pinions, they disappear over the tall trees on the high bank. We resume our journey, and soon arrive at a spot whence a good view of Sion House, the mansion of the Duke of Northumberland, may be gained. This historic pile has already formed the subject of much profitable instruction in the class lessons; for it stands on the site of the old nunnery of St. Bridget, which, on the dissolution of the monasteries, fell into the hands of Henry the Eighth, to become the gilded prison of the unfortunate Catherine Howard. Edward the Sixth granted it to his uncle, Protector Somerset, who began to build the mansion afterwards completed by his rival, the Duke of Northumberland. Later it was the residence of Lord Dudley and Lady Jane Grey; but on the accession of Queen Mary the nuns were reinstated, only to become exiles again on her death.

A pleasant stroll along by the old canal, thickly spangled with the flowers of the water ranunculus, which borders the old deer park of the ancient palace of Sheen, brings us to Richmond Lock much in advance of the steamer. On our way due notice has been given to the Kew Observatory, one of the chief meteorological stations in England. All sit down on the tow-path by the lock, and are soon busy with lunch. This over, a careful study is made of the lock and its mechanism, and all are highly interested in verifying what they have learned in school about locks and their uses. The weir is plainly visible, for the tide is very low, and great pains are taken by the teacher to explain the operation of the "lifting-gates." The lock, with the weir and double over-stream footbridge, is the first on the river. It was opened in 1894 to improve the navigability of the river as far as Teddington Lock, which formerly enjoyed the fame of being the first lock on the Thames. The half-tide lifting-gate weir may be regarded as an excellent type of movable weir. The lifting-gates, twelve feet high, stretch across the three central spans when the river falls below half-tide level on the down-stream side. This retains the river above, at half-tide level between Richmond and Teddington. When the rising tide has reached half-level, the gates, counterpoised by huge weights above, rise out of the water when the mechanism is set in motion, and are lifted up into the space between the foot-bridges high above the river. Here they are turned by guides into a horizontal position, so as not to interfere with the view between the arches. Now a warning shout from one of the boys proclaims the approach of the steamer, and as soon as she is berthed in the lock, and the water has risen to the upper level, all scramble aboard ready for another trip on the calm waters. We steam on under the railway bridge to the handsome six-span bridge at Richmond, passing on our way three beautifully wooded aits, with pleasure-boats bearing smartly-dressed ladies, and gentlemen in boating flannels, rocking gently beneath the sweeping branches which overhang the stream.

The grand rise of Richmond Hill on the right bank next draws our attention, and we come to the conclusion that the view of the Thames from Richmond Hill, acknowledged to be one of the finest bits of scenery in England, cannot possibly be much grander than that of the hill as seen from the river. As we proceed, we note that the river is now wholly a pleasure river. Lovely gardens surrounding charming riverside residences stretch quite down to the water's edge; and as we gaze down at the clear sparkling water, we find it difficult to believe that this is the selfsame Thames that rushes, black and swirling, between the wharves and warehouses of London.

Eel Pie Island (Twickenham Ait) is passed just above the famous Twickenham Ferry, and the steamer now enters the lock at Teddington, giving opportunities for comparison and contrast with the lock at Richmond. From Teddington a five-mile run past Kingston with its boatbuilding yards and riverside promenade, Thames Ditton and Surbiton with their lovely houses and gardens, and the gay line of houseboats by the bank, takes us to the landing-stage at Hampton Court. It is 4 p.m., and we are told that the *Queen Elizabeth* will return punctually at 4.40 p.m., so we are soon ashore, hurrying along the tow-path to the hotel where tea is ready for us.

By 5 p.m. we are steaming down-stream again, this time with the stream in our favour. Below Richmond Lock the young and vigorous ebb-tide sweeps us Londonwards at a ten-knot pace, and in far less time than we wish we are shooting swiftly beneath Putney Bridge, in company with a swarm of barges and lighters making use of the ebb for their journey down-stream. And so onward to the

> "Mighty mass of brick and smoke and shipping,
> Dirty and dusky, but as wide as eye
> Could reach, with here and there a sail just skipping
> In sight, then lost amid the forestry
> Of masts; a wilderness of steeples peeping
> On tip-toe through their sea-coal canopy."—BYRON.

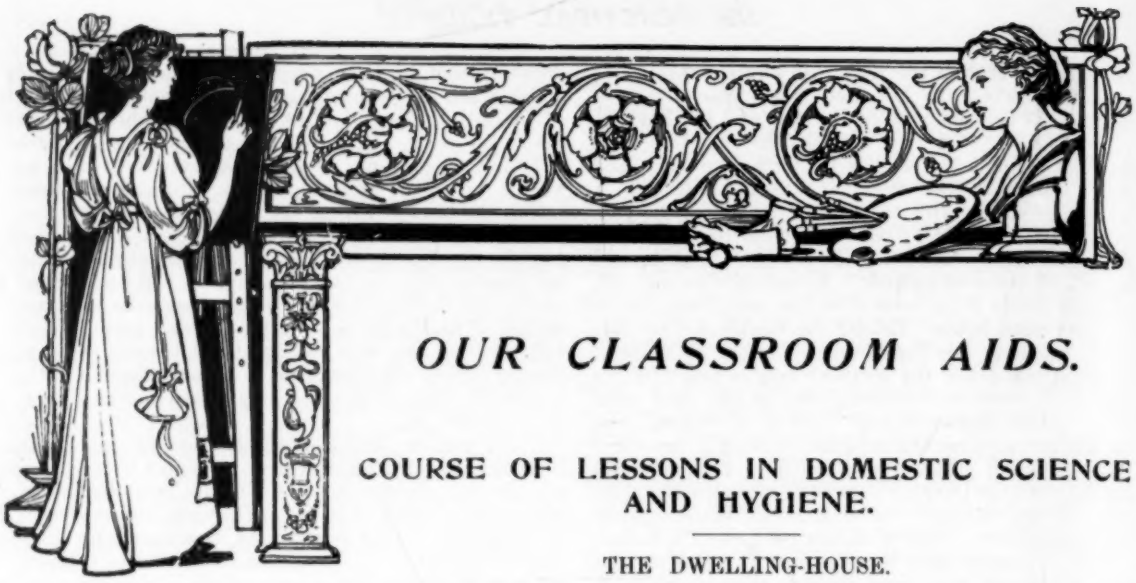
THE PRACTICAL TEACHER

For FEBRUARY

will contain, among many other useful features, the following interesting articles:—

The Parthenon Marbles. The Story of a Famous Procession. (Illustrated.) By W. E. SPARKES.

The Public Elementary Teacher in France. By BENJAMIN DUMVILLE, M.A.



OUR CLASSROOM AIDS.

COURSE OF LESSONS IN DOMESTIC SCIENCE AND HYGIENE.

THE DWELLING-HOUSE.

Step I. Preparation.—A few words on the development of the dwelling-house and of the various kinds of houses to be met with in different lands will serve to awaken the interest of the children in the subject.

Primitive man, feeling the necessity of some kind of protection from the weather, took refuge in a cave or hole in the ground; but as these were not always to be found when wanted, he soon learned to build a shelter of woven branches covered with mud or skins. Such is the home of the Red Indian. His light and air enter at the door, and when this is closed with a skin both are cut off; while the smoke from his fire finds its way out as best it can through a hole in the top. As people became less migratory in their habits, the houses became more substantial in structure, and served as defences against the attack of enemies. The entrance was fitted with a proper door, a smaller opening filled with some transparent substance being made to admit the light, while a chimney was built to carry off the products of combustion.

Many materials are employed for building purposes, but, as a rule, those found in the immediate neighbourhood are used, thus saving the expense of cartage. For this reason the nature of the houses in any particular locality will generally throw considerable light on the geological formation of the district. Thus the preponderance of brick-built houses in London is due to the presence of thick beds of alluvial deposit known as brick-earth; the extensive use of granite, which is abundant in its neighbourhood, has earned for Aberdeen the title of the Granite City; the flint houses so frequently met with in Surrey indicate the presence of chalk-beds; while the stone houses of Bath and Portland show the presence of beds of stone, to which these towns give their respective names.

Having awakened the interest of the children in this subject, they should be asked to prepare a list of the various materials that enter into the construction of a dwelling-house, and the next lessons should be devoted to the presentation of facts connected with the preparation and the properties of these materials.

Step II. Presentation.—*The materials used in the Construction of a house.*

Bricks.—The art of making bricks from clay, either by baking it in the sun or burning it in a kiln, was known from very early times, as is seen from the Bible narrative. At the present time bricks are made by machinery, which thoroughly crushes the clay, tempers it with sand or ashes to bring it to a proper consistency, and then forces it through an aperture in the side of the clay box, delivering it on to an endless band in a long, uniform strip, 4½ inches wide and 3 inches thick. This strip is cut into pieces of nine inches long by means of wires, the bricks thus formed being stacked in a heap and burned. The most important properties of brick are that it is hard, porous, and a bad conductor of heat.

Mortar is made from sand and lime. Lime is obtained by heating chalk, which drives off the carbonic acid gas contained in it, leaving the lime behind. If it is not convenient to burn a piece of chalk to show that lime is left behind, the point may be illustrated synthetically by breathing into lime-water, thus bringing carbonic acid gas and lime into contact, so that they unite and form chalk, which gives the liquid a milky appearance. When lime first comes from the kiln it is usually in lumps, which very readily fall to powder, and is known as *quicklime*. This is capable of absorbing a considerable quantity of water without losing its dry appearance, and when it has done so it is known as *slaked lime*. When lime is slaked, a large amount of heat is evolved, as may be shown by slaking a good-sized lump of quicklime on an old dinner-plate, the bottom of which will become uncomfortably hot during the process.

Sand usually consists of small particles of silica, either quartz or flint, and is formed by the disintegration of larger masses of rock. River sand is best for making mortar, as the sand from the seashore is coated with salt, which will absorb moisture from the atmosphere and prevent the mortar drying properly. In making mortar, one part of slaked lime is added to three parts of sand, the two uniting to form a hard compound which is very durable, because it does not "weather," but, on the contrary, the lime absorbs carbonic acid gas from the atmosphere, thus becoming harder and more chalky in its nature. Since mortar plays such an important part in the construction of a house, it should be of good quality, and for this reason only the best sand should be employed. If clay or road

sweepings are used, as is sometimes done, these will not unite with the lime, but will crumble away as the mortar dries, leaving the building in a very dangerous state.

Stone is, as a rule, not so suitable for building purposes as brick, for, except in the immediate neighbourhood of the quarries, it is more expensive than the latter; then, too, it is not so easily handled; and finally, all stone, except the very hardest—such as granite, etc.—is more susceptible to "weathering" than brick is. Limestone and sandstone are usually employed for building purposes, as they are fairly easily worked with the saw and chisel, but they soon decay and crumble away under the influences of frost and carbonic acid gas. An illustration of this is seen in the Houses of Parliament. An exhaustive inquiry was made by a special commission as to the respective merits of various stones, and magnesian limestone was the one finally selected as being best able to withstand the influences of the weather; but in spite of the care taken in the selection, many of the stones showed signs of decay within nine years of the completion of the building. Another disadvantage of stone is that it is a better conductor of heat than brick is, consequently a stone house is not so warm as one built of brick, unless the walls are made thicker in order to retain the heat.

Flint work is sometimes used for the construction of small houses in chalky districts. The flint itself is practically unaffected by the weather, but a large amount of mortar is required to bind the irregular flints together. Hence the durability of the work depends on the quality of the mortar; but a flint house built with the best mortar is perhaps the most durable structure that can be erected.

Slate is a peculiar kind of stone, possessing a lamellar or stratified structure due to lateral pressure. It is found in North Wales, Cornwall, and Devon, but the most celebrated quarries are the Penrhyn Quarries, a few miles south of Bangor. Here a whole mountain is being gradually quarried from top to bottom. Huge masses are loosened by blasting, and when these are first quarried they are readily split, by means of wide chisels, into thin plates, which are then squared up ready for the slater.

Tiles are made in the same way as bricks, but the clay must be purer and stronger, and requires very careful tempering. It is moulded into the proper shape—either flat for plain tiles or curved for pan-tiles—and baked in an oven.

Thatch is still used in some parts of the country, and consists of straw bound tightly together. It is a bad conductor of heat, and so forms a roof which protects the interior from extremes of heat and cold; but it is not healthy, as the vegetable matter undergoes decomposition; and, furthermore, it is very inflammable.

Concrete is used to form a solid foundation to a building, but in recent years it has also been used for walls, ceilings, etc. As the name implies, it consists of some material such as gravel, crushed slag, etc., bound together by a matrix, either lime or cement being used for this purpose. The former answers for ordinary purposes, but where great strength is required Portland cement must be used. This material possesses many properties which render it particularly well suited for building purposes. It is easily handled during the building operations, and when set it forms a material equal to stone for hardness, and much more durable. It resists moisture, and is practically fireproof, which makes it particularly suitable for the construction of public buildings.

Plaster is extensively used for covering rough surfaces, and varies very considerably in composition, according to the purpose for which it is to be used. For coarse work lime and sand are mixed with water, hair being added to bind it together; but for fine or ornamental work gypsum or plaster of Paris is used. This is one of the forms of sulphate of lime found naturally diffused in other rocks, particularly in new red sandstone. For fine plaster the gypsum is broken into small pieces and burnt in an oven, after which it is ground between two stones, sifted to a fine powder, and then only requires the addition of water to make it ready for use.

Wood used in the construction of a house can be divided into two groups—(1) coniferous timbers—pine, fir, cedar, larch, etc.; (2) hard or non-coniferous timbers—oak, ash, beech, etc. The coniferous timbers are less expensive and more easily worked than the hard woods, and are consequently used for the construction of cheap dwellings; but they are not so durable. The timber is felled in the winter or early spring, when the trees contain very little sap; but before it is fit for use it must be "seasoned" to remove this sap. For this purpose the trunks are sawn into planks, which are stacked away for about two years in order to allow the sap to evaporate, during which process the fibres are drawn more closely together, causing the planks to shrink in breadth. To keep timber lying idle all this time greatly enhances its cost, so unscrupulous builders often use "green" or unseasoned wood in their work. If this is done, the shrinkage will still take place; but in this case it occurs after the various pieces have been fitted together, the result being the cracks between the floor-boards, the ill-fitting windows and doors, etc., found in a badly-built house.

Glass has now taken the place of horn or oiled paper with which our forefathers closed their windows. The sheet-glass used for glazing windows, etc., is made by melting sand or flint with either soda or potash. When the mass is in a molten state a workman takes a quantity on the end of a tube and blows it out into a cylindrical shape. This hollow cylinder is then split open and rolled out into a flat sheet.

THE author of the article on the Cape to Cairo Railway in our November issue wishes to acknowledge his indebtedness to Mr. G. A. Hobson, whose paper in the *African World* was largely the source of his information.

WE have just seen a little booklet of "Swan" Fountain Pens, which should prove of great assistance to the distracted Christmas shopper. First is given a most useful list of dates, showing when cards, letters, and presents should be posted to reach friends in the Colonies and foreign countries by Christmas. This will serve our readers for next year with a slight change. Next comes a list of one's supposed relatives, with a blank space to fill in the present for father, mother, etc., whenever a clever thought may occur to one, the most clever thought being, of course, a "Swan." Occasion is taken to point out how eminently suitable a "Swan" pen is for each individual relative or friend; and when one stops to think of it, this is very true, a pen-point which comes home to one on turning to a list of suggested articles of every description introduced "for those who never have occasion to write." "Swan" pens are always good, be they 10s. 6d. or £20 in price, and always prove most acceptable. We cannot offer a better suggestion, therefore, than—fix on a "Swan;" but first write for one of these Christmas booklets or a free catalogue to Mabie, Todd and Bard, at either High Holborn, W.C.; Cheapside, E.C.; Regent Street, W.; or 3 Exchange Street, Manchester.

"WHAT MEAN THESE STONES?"

THE STUDY OF ARCHITECTURE IN ITS RELATION TO HISTORY.

BY EDMUND A. GREENING LAMBORN,
Headmaster S. Mary Magdalene Schools, Oxford.

(*Continued from p. 246.*)

THE GOTHIC STYLE.

The Outward Visible Signs (continued).

THE PERPENDICULAR STYLE, 1380–1550.

THERE was, as we have seen, some slight indication, even in the Decorated style, that Gothic architecture was passing its prime. During the last years of Edward the Third a great national disaster is reflected in the building of that period. The Black Death which half depopulated the country carried off a corresponding number of skilled workmen; and so in buildings of the later Decorated period we often find work which, though of characteristic Decorated design, in execution is in striking contrast with the fine chiselling of earlier work. With the recovery of architecture from this blow appears a new development of the Gothic style, which has been named "Perpendicular." It derives the name, a singularly appropriate one, from the striking characteristic of the window tracery. It has been said that in the tracery of the late Decorated period—1360-75—long curves spring from the heads of the lights to the top of the window, with only the slight waviness of soaring flames. After 1375 the curves of the tracery show a distinct tendency to straighten out, like a flame burning steadily. Straight bars, usually vertical, but sometimes horizontal, are found among the curves. Then the mullions which formerly were lost in the arches of the lights or curved into the tracery run up vertically to the head of the window, shorter straight pieces run up parallel from the points of the lights, and the only curves are in the arches of the lights. By the end of the fourteenth century, when the new style was fully established, the tracery is thus composed almost entirely of straight lines crossing at right angles. The windows are increased still further in size till the walls are merely great windows, separated only by the buttresses on which their whole strength depends. These large windows of numerous lights are subdivided horizontally by transoms, and are thus cut into many rectilinear figures, whence are derived the many-paned windows of houses of to-day. The great characteristic of the style, therefore, is squareness or "perpendicularity," which becomes more and more pronounced as the work grows later. The increased width of the windows is accompanied and facilitated by the general use of a new form of arch—"the four-centred arch"—the proportions of which were gradually depressed till in late Perpendicular doorways and windows the "arches" consist merely of two straight lines, making a very obtuse angle in the head and rounded off at the junction with the jambs. Square-headed windows are very common after 1500; the heads of their lights are foliated with cusps—usually "multifoiled," which is always a sign of late work (the best tracery is trefoiled)—but there is no tracery above. After 1550, in the "Elizabethan" period even the cusps are omitted.

The departure from the vertical principle, which is one of the chief characteristics of pure Gothic, is strikingly exemplified in the roofs of churches of this period which include the majority of the mediæval roofs stil existing. Their gables are often as low as the Classic pediments. The beautiful feature of these roofs, however—and, indeed, of the Perpendicular style—is the carving of the woodwork, which was probably not equalled in any other period (though there is very little earlier woodwork remaining with which to compare it). This period produced the splendid "hammer-beam roofs" and the beautiful carved screens and pews which are such remarkable features in churches, especially in the eastern counties.

After the window tracery and the depressed arch, the next great distinguishing mark of the Perpendicular style is the panelling with which the walls are enriched both inside and out. These panels are formed of patterns resembling those of the window tracery, sunk rather shallow in the face of the wall. Shields, trefoils, quatrefoils, and other patterns are also used in the panels. In the doorways of this style the depressed four-centred arch is especially noticeable, giving a square outline to the door-head, which is

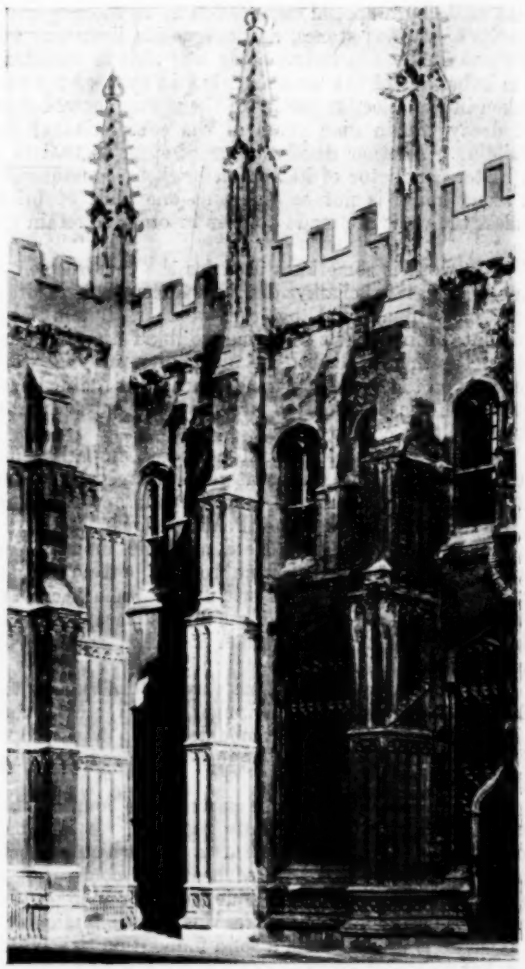


FIG. 39.—The Divinity School, Oxford, with Bodley's Library above, 1450, showing (*a*) windows with four-centred arches, Perpendicular tracery and transoms; (*b*) Perpendicular buttresses with panelling, terminating in crocketed pinnacles.

accentuated by the fact that the label or dripstone over it is horizontal and square, and hence does not follow the curve of the arch as in the preceding styles. In the three-sided spaces between the arch and the label, known as the spandrels, shields are placed, or panels are sunk. The shafts and piers in this style usually have very high octagonal bases, and their mouldings are shallow and ill-defined. Often the eight faces of the pillars are slightly hollowed instead of being "plane." The buttresses, which become of increasing structural importance on account of the size of the windows, have a consequent increased projection, and are often panelled over their whole surface. They are also much more numerous, a buttress being often

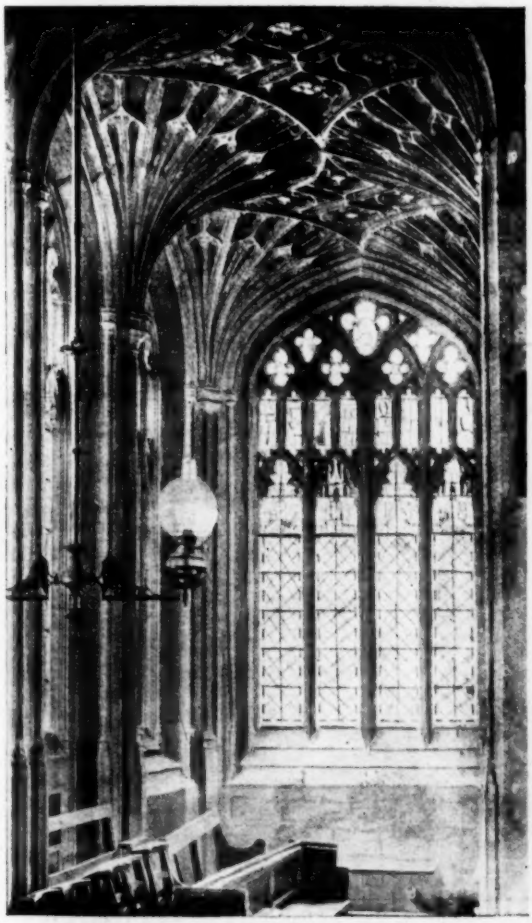


FIG. 40.—The Wilcote Chantry Chapel, North Leigh, Oxon, 1440, showing Perpendicular window tracery of unusually good design, and a vaulted roof with "fan-tracery."

placed between each pair of windows. A frequent addition to churches in this period is the porch, usually to the south door. Perpendicular porches are larger and more numerous than those of previous styles. They usually have above them an upper room, known as a "parvise" or "paradise."* Usually, too, they have vaulted roofs, which exemplify the characteristic vaulting of the style in which the ribs radiate in the shape of a fan, and which is hence called "fan-tracery vaulting." The ornamentation in the Perpendicular period consists very largely of panelling, which is used profusely. The foliage by this time has lost the abstract beauty and grace of the Early English stiff-stalked foliage, and has not the natural truth which distinguished that of the Decorated period. It consists of conventional forms, which have not even an abstract beauty, but are stiff and lifeless, and in the latter part of the style partake of the general squareness which characterises it as a whole. A common ornament is known as "the Tudor Flower," which somewhat resembles the *fleur-de-lys*, and is used especially on the crests of the carved screens, which are very common in the style.

By the middle of the sixteenth century Gothic architecture was a dead thing. The next hundred years, so full of historical incident and interest, are architecturally almost a blank. What activity there was, was in the direction of domestic architecture; and this period, which laid the foundation of the prosperity and wealth of the country, will be best considered in connection with the next period, in which the growth of economic prosperity is shown by the erection of great houses all over the land.

GOTHIC ARCHITECTURE.

The Inward Spiritual Meanings.

We have seen that so early as the Norman period the spirit of the Northern peoples begins distinctly to impress itself upon their copied architecture. We saw love of change, generosity, and enthusiasm in the variety and profusion of Norman ornament, and undisciplined imaginative power in the Norman sculpture. In Gothic architecture these attributes are exemplified still more completely. Variety is its most striking characteristic. "The Gothic spirit," says Ruskin, "invented a series of forms of which the merit was not merely that they were new, but that they were *capable of perpetual novelty*. The pointed arch was not merely a bold variation from the round, but it admitted of millions of variations in itself; for the proportions of a pointed arch are changeable to infinity, while a circular arch is always the same. The grouped shaft was not merely a bold variation from the single one, but it admitted of millions of variations in its grouping and in the proportions resultant from its grouping. The introduction of tracery was not only a startling change in the treatment of window lights, but admitted endless changes in the interlacement of the tracery bars themselves." In a Gothic church, then, with no two windows alike, with a differently-carved capital to every pillar, with arches of varying forms and doors of different heights, one aisle wider than the other and one perhaps longer, we may trace clearly enough the influence of that many-sided, restless genius which (and more especially in the case of the English) is the heritage of the mixed Northern blood. "The Greek could stay in his triglyph furrow and be at peace; but the work of the Gothic art is fretwork still, and it can neither rest in nor from its labour, but must pass on, sleeplessly, until its love of change shall be pacified for ever in the change that must come alike on them that wake and them that sleep." Idealism and energy are the moral and mental attributes which together move the world along the path of progress. The Teuton's possession of both is proved in his archi-

* Strictly speaking, a paradise or paradesian was the enclosed pleasure garden of a monastery, but the term is now commonly applied to the upper room of a porch.

tecture, as well as by his position in the march of progress. For the variety in Gothic architecture is the evidence not only of love of change and of a wealth of ideas: it reveals the idealist's dissatisfaction with the results he had attained; each variation in moulding or capital means some new attempt to improve a little on the last, to approach a little nearer to the ideal of beauty or usefulness; and the workman's mental energy may be measured by the amount of that variation, which shows the efforts he made to attain it.

From this variety, too, may be gathered a social fact as well as a spiritual one. It proves the complete freedom of the workman. There is no evidence of a master mind, of which the inferior workman was but the tool. A glance at the irregular foliage, the grotesque corbels, the varying mouldings, will show that these came straight from the mind of the *workman*, and were not executed from another's drawings. The plan and general proportions of the church were doubtless laid down by the master builder—bishop, lord, or monarch—but the details show the *mind* of the workman as well as his manual skill. And this brings us to another great attribute of Gothic, from which, indeed, the style was so named. The term Gothic was first applied to the Northern architecture at the time when the Renaissance had inspired all Christendom with an ill-considered enthusiasm for all things Classic and a more ill-considered contempt for all things not so. It was intended as a term of reproach, and referred to the rudeness which is one of the most essential characteristics of mediæval work. The Renaissance architects sneered at the rugged monsters of the Gothic gargoyles, at the uncouth corbels and irregular foliage, and endeavoured to emulate the precise, minute, and delicate forms of the Grecian architects. But they overlooked two vital considerations, which a little reflection will reveal to us. One is a moral, the other a physical one. The perfection of execution in Classic detail was only obtained by reducing the inferior workman to the level of a machine. He was made to execute such ornaments only as could be exactly copied from his master's drawing; and he practised these continually, all his spiritual force bent upon the manual execution alone, till he became absolutely perfect in the manual act, but at the cost of the loss of his individuality. (We in the schools are only just beginning to realise that we have made the mistake of treating the children in the same way. We have, for instance, given them drawing copies of symmetrical foliage—borrowed also from the Greeks—and have required them to make exact copies of these, as if the acquisition of manual skill were the whole aim of our drawing lessons. The child has merely copied from the flat the lines which another's eye has seen and interpreted in the round. We, like the Greek slave-master, have suppressed the child's individuality, and bent his spiritual force upon his finger ends, that he might slavishly transcribe the *ideas* of another. And there are still many who complain that the old order was best, because the execution was better, "the results were prettier.") This rudeness of the Gothic carving, then, is just that fact that proves the fundamental superiority of the Northern architecture over the Classic. It is the result and the proof of respect for the individuality of the workman. "You cannot have the finish and the varied form too. If the workman is thinking about his edges he cannot be thinking of his design; if of his design, he cannot be thinking of his edges. Choose whether you will pay for the lovely form or the perfect finish, and choose at the same moment whether you will make the worker a man or a grindstone." Ruskin is speaking of cut glass, but he applies his argument to Gothic sculpture. The other consideration disregarded by the Renaissance architects was the great difference between the natural conditions of the Northern and Southern countries. The marble and alabaster of Italy and Greece are replaced in the Northern countries by rough freestone and rugged granite. And the gargoyles and crockets of Gothic buildings have to brave weather which would blur and ruin the delicate chasing of Grecian sculpture, while their gables and pinnacles throw off the snow that would gather and weigh upon the domed or flattened roofs of Greece and Rome.

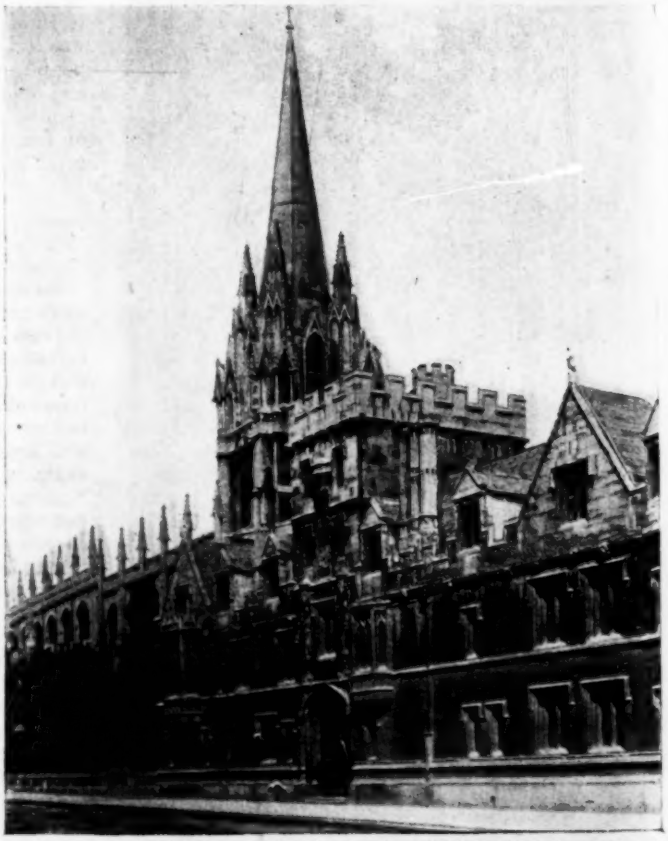


FIG. 41.—A Gothic Group: S. Mary's Church and All Souls' College, Oxford. The spire is "Perfect Gothic," 1310; the rest of the church is Perpendicular, 1420; the front of the college is later Perpendicular, 1460.

The profusion of ornament characteristic of Gothic work I have already referred to, and the photograph of Amiens Cathedral here reproduced illustrates this

characteristic very well, in spite of its shortcomings in the matter of perspective, the cathedral front being "lost in the tapestry of its traceries like a rock among the thickets and herbage of spring." Every Gothic parish church, however, illustrates in its measure this redundance of ornament in the carving, and mutely testifies the ungrudging, unselfish labour of the workman, whose enthusiasm for his work made him oblivious of the fact that other men would enter into the fruits of his labour.

In the grotesque sculpture which distinguishes Gothic architecture one may see, in addition to the early signs

FIG. 42.—West Front, Amiens Cathedral; late 13th century.

of the untrammelled, imaginative power of a race which was to produce such poets as Shakespeare and Goethe, and such thinkers as Bacon and Newton, the evidence of that broad sense of humour, that fun-loving spirit, which is so especially the possession of the hearty Teutonic peoples. This characteristic of Gothic is particularly noticeable in those churches which were formerly connected with monasteries, as Merton and Cumnor, Oxon, where all the carved corbels have such funny, yet withal such human, expressions, that it appears that the humour of the monastic sculptors found a practical vent in caricaturing one another in stone. In the capitals of the nave arcade at Woodstock may be seen many cowled faces of monkish type with facial peculiarities exaggerated. Most of them might be copied by the caricaturist of *Vanity Fair* to-day, and would pass for caricatures of leading churchmen, showing that the ecclesiastical type of face now is much the same as it was six hundred years ago.

There is another vital characteristic of Gothic art which is hardly traceable, even in late Norman work, and is not very marked until late in the Early English style, but forms the most striking feature of the Decorated period. It is the presence of carved foliage, which in Early English work has all the abstract grace of nature and in Decorated work shows with growing truth the actual foliage of the woodlands round the church. Tracery itself, with its curves and foliations—tracery which is the peculiar possession of Gothic art alone—is but the attempt to transfer to stone those abstract beauties of curves and proportions which the Gothic workman saw in the vegetation of his woodland home. The Spirit of the Woods sleeps in a Gothic church. The beauty of a Gothic aisle is the beauty of a forest glade. Perhaps the deepest truths of the Northern nature are revealed in this love of natural foliage. First there is the love of truth, which even to-day gives the Englishman such a good reputation for integrity but such a bad one as a diplomatist. The instinct for truth in the Gothic workman taught him that the stereotyped conventional forms of his Classic heritage were false and unreal, and he breathed his spirit into them, so that they took life and living grace and beauty. Then in their love for the tender leaves one can trace that gentle kindliness which, with all their roughness and fierceness, was ever present in the wild hearts of our fighting forefathers. I never look at the buds and flowers of the Decorated style, carved for the most part when the whole strength of the English race was directed in war and bloodshed against their French enemies, without pausing to ponder over that strange mixture of savage bravery and humble gentleness which produced chivalry and the Black Prince. To me, too, it is more than a coincidence that the execution of the most part of this natural foliage should synchronise with the time of Chaucer. English poetry has always been largely concerned with the things of external nature, and in the father of English poetry one may trace that same instinct which caused the workman to carve, and the worshipper to delight in, those flower forms which were the subjects of so many of Chaucer's lines and of the builder's decorative art. Until Chaucer architecture had been the one medium for the expression of the artistic feeling of the race, the only national art. With him the racial spirit finds a new medium for manifestation. But the promise of all the arts is to be found in architecture, which is the first of them, and all subsequent art reflects the same characteristics, only more fully. Thus the racial love of nature reflected in Gothic architecture is manifested throughout the whole history of English literature and painting. The people which produced stiff-stalked foliage must inevitably have produced Wordsworth and Constable in the fullness of time. This carved foliage is evidence also of growing civilisation. The

savage observes vegetable forms with a view to their utility only, not to their beauty. The dangers of the woods, too, are too many for him to suffer his eye to dwell in contemplation on any individual plant form. To the Norman also, whose business was war and his recreation the chase, the woods were but so much cover for his enemies or his quarry. But the quiet contemplation of leaf and flower forms and the appreciation of their beauties which led the workman to take them for his models are the sure signs of developing æsthetic faculties, of a more thoughtful, tranquil existence, and of advancing civilisation.

Yet another essential characteristic of Gothic architecture is termed by Ruskin "rigidity." It may be defined as "stiff strength," in contradistinction to the "solid strength" of the previous styles in which one dead weight was supported on another still more massive. "It was the Gothic builders," says Miss E. A. Browne, in one of the latest works on the subject, "who perfected the discovery that it is possible to put life into stones, whereby they are enabled to relax much of the strain on a support, and (by the support of balance in the distribution of the weight) to relieve it of that burden of uncompromising pressure imposed on it by inanimate weight." So one gets an impression of elasticity and "spring" from the thin spires and pinnacles and flying buttresses, the pointed arches and sinuous, soaring tracery, of good Gothic work. They have the strength of sinew, and not of bulk; of active energy, not of inertia. Ruskin traces in this characteristic "the strength of will, independence of character, stern self-reliance, resoluteness of purpose, impatience of undue control, and that general tendency to set the individual reason against authority, and the individual deed against destiny, which in the Northern tribes has opposed itself throughout all ages to the languid submission in the Southern, of thought to tradition, and purpose to fatality."

In this uncompromising uprightness may be read also aspiration and faith. A Gothic spire is in itself a creed, defiant and definite. It takes its stand squarely and firmly upon earth, and looks up straight to heaven. It and its belfry bells alike have one purpose—to testify to Him for whose service and honour they exist, and to proclaim the faith of our fathers: "this is none other but the house of God, and this is the gate of heaven."

A last attribute of Gothic to be suggested for the reader's consideration is its homeliness. This may seem a strange characteristic to discover in an architecture which numbers among its examples the great cathedrals of the world. Yet in two very real senses Gothic is a homely architecture. In the first place, it is to be remembered that Gothic is not a mere ecclesiastical system of building. Every building, castle or hall, manor house or farm, erected in the Gothic period exemplified the same principles, and showed in its measure the same characteristics as the church. "When the pointed arch was used in the church, it was used in the street." There are no "orders" in Gothic architecture. It was under no limitations of measurement or plan, and therefore a cottage may be, and often is, as Gothic in style as a cathedral. It will not have the spires and pinnacles, the variety and redundance of ornament, of the house devoted to the glory of God, but it will have a narrow-gabled roof, mullioned windows, and moulded labels, and it will please the eye in its degree with its changefulness and quaintness, just as the grander building, in its degree, with its foliage and grotesques. Secondly, Gothic is homely in the sense that it makes use of homely materials. A Classic building is impossible without the great blocks of hewn stone brought from, it may be, distant quarries. But Gothic building art, as it is catholic in its application to varying types of buildings, so it is able to accommodate itself to varying conditions of material. Flint, oolite, or freestone—the Gothic builders took that which was nearest, and hewed their parish church from the hills of their native district. This homeliness of Gothic will be touched upon again in the next paper in considering the Renaissance period, and in a later one dealing with the evolution of the village church. Homeliness, in the first sense we have considered, is evidence of the catholicity of the Gothic mind of which Shakespeare is the arch-type, universal in its grasp, protean in its manifestations, limited to no one sphere of activity, but adapting itself as effectually to the varied ranges of human endeavour as its architecture did to the varying necessities of human habitations. It will be seen later how the use of homely materials also proves the versatility and resource of the workman, who, in the face of natural difficulties, where the highly-specialised Classic builder would have been helpless, took the materials nearest his hand, mastered their possibilities, and turned them into things of beauty which are a joy to us half a thousand years after. It is this flexible, resourceful *Gothic* spirit, undaunted in difficulty, ingenious, adaptable, which we are now trying to foster in the schools instead of the highly-drilled, painfully-neat, and precisely-accurate machine-made product of Scheme A and the drawing examination.

Thus then, briefly, I have endeavoured to put before the reader some of the ways in which the nature of the Northern peoples may be traced in their national architecture. If he has been interested enough to resolve to follow up the study, using *The Stones of Venice* or the *Seven Lamps of Architecture* as a guide, he will find here a wide field for deduction on the results of his observation, and ample scope for the play of his imagination; and if it be objected to any of the correspondence thus traced that it is fanciful, there is room enough and to spare for the play of fancy in the elementary schools.

COMMON-SENSE NEEDLEWORK.

BY MISS FLEMING,

Authoress of "How to Teach Needlework," "Pupil-Teachers' Needlework," "Sewing-class Guides," etc.

PATCHING UNDER-GARMENTS (*continued*).

Fasteners for Children's Clothes.

GIRLS who have been taught sewing on the lines indicated should be *expected* to keep their clothes in good condition, so it will not be out of place to devote a chapter to the consideration of the fastenings of garments such as children wear.

All clothing fasteners keep the garment in shape. If one comes off, the others have a greater strain on them, which considerably reduces their length of life.

Children are often very sensitive. A sense of self-respect is engendered by the knowledge that their

clothes are neat and tidy. On the other hand, a feeling of discomfort is induced by improperly fastened garments, and, although use may often blunt their sensibilities, still the discomfort and the disadvantage are there all the same.

Many colds, too, are caught by dress-tops being unfastened both back and front. The common substitute —the pin—is highly dangerous.

If buttons, hooks, etc., are strengthened as soon as the thread becomes loose, a great saving of labour will be effected.

The method of sewing pierced buttons has already received attention.

Buttons with shanks are sewn on rather differently. They require stronger cotton, and do not need stemming, as the shank itself provides room for the buttonhole between it and the garment. Enough stitches should be put in to make the shank firm, but the cotton should not be drawn too tightly. The cotton is made secure by two or three stitches on the underside. The needle is brought through from back to front. It is put through the button-loop, and then taken from front to back. In this manner it is passed backwards and forwards until the button is secure. The cotton is fastened off by two or three back-stitches, one on the top of the other.

Strong linen thread should be used for boot buttons. Shabby boots, well buttoned and blackened, look better and wear longer than good boots uncleaned, with the flap hanging loose.

An approving smile or word from the teacher, when a repair has been voluntarily made, will be amply appreciated, and is in itself a sufficient reward.

Aprons are often seen with the collar and straps *pinned* down to the dress at the back, or left loose, when the bib and front hang down in an untidy fashion.

As setting on strings is taught in Standard III., there can be no excuse for a girl offending in that particular after she leaves that class.

When the girls are too young to make a buttonhole, a loop of tape could be attached to the back of the collar or the bib, and strings sewn to the waistband. One of the strings slipped through the loop keeps the bib or collar in place.

Hooks and eyes and the cotton by which they are attached should be suited to the garment on which they are fastened—*e.g.* black hooks should not be sewn on a white dress, nor with white cotton, nor *vice versâ*.

Loops are used where "eyes" would be clumsy and would not look trim. They are stronger when worked in silk, but cotton, the colour of the garment, is allowable.

To make a loop the cotton is secured by one or two short stitches on the underside. The needle is brought through to the front and put back along the same thread towards the right, making a stitch as long as the loop is required. It is then put backwards and forwards until there are four or five strands set closely together. These are buttonholed for greater strength. The buttonholing or overcasting commences at the left end of the loop. The strands only are taken up, not the material underneath it, as is done at the square end of a buttonhole. The cotton is held in place by the left thumb until the needle is drawn out. As the point of the needle sometimes catches in the calico, the eye may be put through first. To finish off, the cotton is taken through to the back; a little back-stitch is made, and the end is cut off.

Loops may also be used for small pearl buttons on blouses, muslin pinafores, and babies' clothes. They are worked as described above, the length of the strands being the diameter of the button.

Eyelet holes are also occasionally used for holes where dresses are laced, and to allow for a draw-string to pass through a bag or child's pinafore. They frequently occur in embroidery. The hole itself is made with a stiletto. This is a smooth, sharp-pointed steel or bone pricker, sold for the purpose, made after the fashion of the instrument patronised by Italians. The hole is overcast by means of regular, short stitches placed close together, like the round end of a buttonhole.

Rolling and Whipping.

Whipping, another form of gathering, is the overcasting of a raw edge previously rolled, so that it will draw up and be neat for ornamental purposes.

Soft fine material, such as mull-muslin, nainsook, and cambric, is generally used for frilling. Anything thick would make a clumsy roll.

The frilling must be torn *across* the material, with the selvedge the depth of the frill, otherwise it sets very badly. The width of the frill is a matter of taste.

A very tiny hem is made round the foot of the frill. Fine cotton should be used for such sewing, No. 100 being very suitable.

The length of the frill is usually twice that of the band, but a little over that quantity improves the appearance.

All fraying, fluffy edges should be cut off before the rolling begins, as they add to the thickness and render the exercise less trim and neat.

Coarse or even double cotton is used for whipping, as the drawing up is liable to break the thread, which would necessitate the whole being done again.

The roll is made on the wrong side of the material by holding it between the thumb and forefinger of the left hand, and by rubbing the muslin gently up and down until the raw edge is hidden and a neat, tight, firm roll obtained.

It is needless to say that the hands should be perfectly clean. Only a small portion should be rolled at once. A little experience will soon give the size of the roll. It must be just enough to allow the raw edge to be enclosed, and will usually be about eight or ten threads deep. Make the commencing cotton secure by seaming two or three stitches close to the end of the roll.

Whip Stitch.—Put the needle in at the back of the roll. Point it in a slanting direction to the left. Bring it out in front *quite under the roll* (Fig. 2).

Demonstrate the stitch on the illustrator. It makes a long slanting stitch on the top of the roll, and a short one under (Fig. 1). Care must be taken not to catch the needle in the roll, as that prevents the drawing up. If the overcasting is very close, the thread cannot be easily pulled up when forming the frill. If too far apart, the edges look clumsy and untidy, and the roll comes undone.

The whipping stitches are to be even and regular (Figs. 2 and 3).

As the worker becomes expert, two or three stitches are taken on the needle together.

Draw up the whipping cotton to equal the length of the band, and twist it round a pin to fasten it.

Pin the band and frill together, making the halves

and quarters meet and arranging the fullness evenly (Fig. 4).

Seam the band and frill together on the wrong side.

WHIPPING.

Fig. 1.

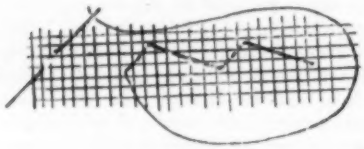


Fig. 2.

Fig. 3.

Fig. 4.

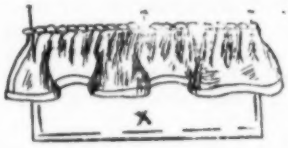
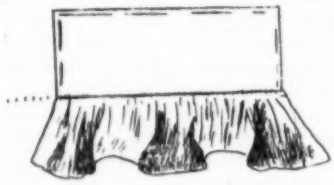


Fig. 5.



Commence by working a few seam stitches backwards way; then turn the work round, having the frill facing the worker. Point the needle towards the chest in a horizontal position, and let each stitch fall into the groove of the whipping.

Finish off by turning the exercise round and working a few seam stitches backwards way. Stroke the seam flat (Fig. 5).

The strips used for teaching purposes need not be hemmed, and tapes cut the required length will serve instead of bands for setting on the frill.

Both tapes and strips should be marked at the halves and quarters, that the fullness may be evenly distributed. When a long length of frill is needed, short needlefuls of cotton will be better than long ones, which are apt to break.

Hand-made frilling is a pretty and economical form of trimming body linen and pillow-cases. Mull-muslin is suitable for the purpose. It is one yard wide, and costs about 9d. per yard.

Lawns and cambrics are other varieties of muslin which look equally well for frills.

Flannel Binding.

Binding is a method of making neat the edge of a material, usually flannel, by covering it with ribbon, tape, or braid, to protect and strengthen it, and to keep it flat and neat.

Galloon or flannel binding, a kind of silky braid, which can be bought in white or colours and in various widths, is used for this purpose. One side has a more finished surface than the other. That is of course the right side. It is commonly used for babies' barrows or long flannels.

The binding is folded or turned down one-third or one-fourth of its depth, the upper or narrow turn falling on the right side (Fig. 6). The raw edge of the flannel is slipped into the fold between the two edges, and just fits into the crease in the binding.

It is tacked through the top fold of the binding only. The galloon itself is held rather tightly in the left hand, but the flannel is held rather loosely. The binding is then sewn on the right side by hemming or back-stitching, but in neither case must the stitches go through the under side of the binding (Fig. 7).

To prevent this, it is advisable to hold the back of the binding out of the way while the right side is being worked.

To Turn the Corner.—With the tip end of the needle make a diagonal pleat, which should lie evenly on both right and wrong side. The right side fold will fall towards the right hand, and, if the work is turned round, it will be seen that the fold on the wrong side will fall towards the left hand. Slip the needle to the top of the fold, and secure it by stitches matching the right side (Fig. 8).

The wrong side of the binding may be either felled or run, but the stitches must plainly show through to the right side (Fig. 9).

Binding a Curve on Flannel.—The binding will require to be eased round the curve to prevent the flannel puckering (Fig. 10).

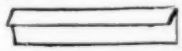


Fig. 6.

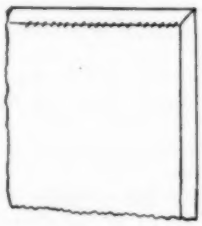


Fig. 7.

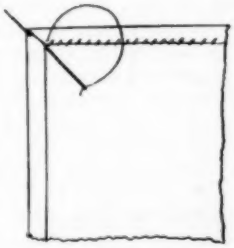


Fig. 8.

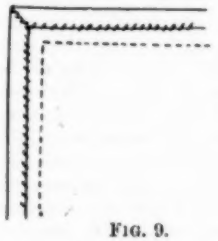


Fig. 9.

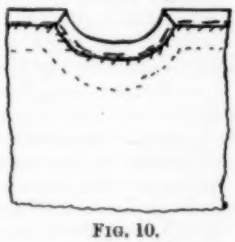


Fig. 10.

The fixing needs great care. A double stitch should be put in occasionally to render it more secure.

The binding will appear fuller on the *wrong side*, as it is deeper there than on the right side, but it must be kept as flat as possible.

NOTES ON AN EXPERIMENTAL COURSE OF LECTURES ON PLANT LIFE AND SOIL.

BY EDWARD J. RUSSELL, D.SC. (LOND.),
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(*Concluded.*)

The Organic Matter in the Soil.

IT was pointed out in an earlier lesson (p. 91) that a rich garden soil contains about 5 per cent. of organic matter, and a clay soil may contain somewhat more. In well-drained, well-aerated soils these numbers are not much exceeded, notwithstanding the large annual additions of plant roots, leaves, etc. We shall see later on that there are destructive agencies at work under these conditions, which prevent the accumulation of organic matter.

Should, however, the soil be wet and not aerated, decomposition does not proceed rapidly. In some cases the plant remains will go on increasing, and become converted into the brown or black substance known as peat.

A Peat Bog.

There happens to be a peat bog not far from the school, and a careful examination was made with a view to discovering how it arose. It lies in a saucer-shaped depression, and samples of the soil taken at one or two points outside it were found, by the method of Experiment 72 (p. 128), to be quite impermeable to water. Evidently the bog stands on clay, and receives the drainage of the hills around; this accounts for the perpetual wetness of the land.

Some of the black soil was dried and burned on a tin lid. It gave the smell, and also the glow unaccompanied by flame, characteristic of a peat fire. As a matter of fact some peat has been used for fires in Kent, but so long ago that even the tradition seems to have died out. A red ash was left behind.

The dried peat was brown in colour. It was handed round the class, and was found to consist of fibres, stems, and leaves of plants, with much disintegrated matter.

All these observed facts fully accord with the hypothesis that the low temperature and wetness of the land interfere with the decomposing agencies, and favour the accumulation of plant residues.

A red slime was observed in the ditches. This was said to be iron, and the correctness of the statement was proved in the following way. Some iron filings were warmed in an evaporating basin with nitric acid. After the action had ceased water was added, and the solution was divided into two parts. To one a few drops of potassium sulphocyanide solution were added: an intense blood red colour was produced. The other was treated with some potassium ferrocyanide solution: a deep blue precipitate was obtained. The red, slimy material was treated in a similar manner, and gave the same results as pure iron. We are justified, therefore, in saying that it contains iron.

Analogy with Coal.

The analogy between peat and coal is obvious. Both burn, leaving an ash. In the museum we had several pieces of coal on which the form of a leaf or stem could be readily traced. If the peat bed lasted long enough, and were compressed by having new and thick layers of soil deposited on top, there seemed no reason why it should not in time change into a coal bed.

If coal originates in somewhat the same way as peat, we should expect to find, though perhaps in an altered form, the iron compounds we found in the peat ditches. Such masses of iron compounds do occur in the coal measures; in fact the proximity of coal and iron is known to have been an important factor in industrial development.

Living Organisms in the Soil, and the Work they do.

The soil, which appears to us to be a lifeless mass, is really inhabited by a teeming population of organisms so small that some fifty thousand of them would be required to make an inch, and so densely crowded that in a salt spoonful of soil there may be several millions present. It is impossible without a microscope to show these organisms, but it is easy to demonstrate the kind of work they do.

Disease Organisms.—The bacillus producing tetanus, or lockjaw, is of frequent occurrence in the soil, and there are numerous cases on record where this disease has set in through soil getting into a cut. Other disease organisms also occur. The teacher should emphasize the importance of thoroughly washing the dirt out of a cut place before proceeding to apply a bandage.

Organisms causing Decomposition.—These play a very important part in rendering the soil fit for plants. Organic matter *per se*, whether of animal or vegetable origin, does not make a soil productive; only after certain bacterial actions have taken place, transforming it into simpler substances, is its beneficial action apparent. The decomposition produced by soil is well seen in the following experiments:—

Experiment 97.—Put equal quantities of milk into two flasks, and then close as tightly as possible with plugs of cotton wool. Boil the milk; put aside to cool. Into one flask, when quite cold, introduce a small fragment of soil and shake well up; then let the flask stand for a week in a warm place. On opening both flasks it will be found that the milk in the one without soil is quite good, while the milk in the other has undergone a profound change. It has usually clotted, smells somewhat, and a growth of mould has taken place. The change is brought about by the organisms of the added soil.

Experiment 98.—Open an egg, transfer it gently to a flask, introduce a little soil, shake up, and close with a cotton-wool plug. After a day or so decomposition has gone so far that the characteristic odour of decaying egg can be recognised.

These two experiments show the injurious effect of dust and dirt on foods; the amount of decomposition is quite out of proportion to the quantity of dust which gets in.

Experiment 99.—Lay a leaf in a pie-dish, cover it with water, and add a little soil, sprinkling it all over the leaf. In a few days the leaf has almost disappeared, only the fibrous parts surviving. A young watery leaf—for example, nasturtium or turnip—shows this result very well.

Where there is a school garden the following is very instructive:—

Experiment 100.—Divide a plot of ground into several strips. Into one dig some straw, into another leaves, into a third peat moss, and into a fourth any other organic substance available—for example, small

pieces of cloth, wool, hair, finely-divided hoofs or horns. This is to be done in autumn. In late spring turn up the ground again: much of the original substance has disappeared, and there is left a black, powdery body called "humus." This does not remain for long. Some of it dissolves in the soil moisture and is washed on to the soil particles, and so becomes widely distributed. Another portion is changed mainly into volatile substances—carbonic acid, water, ammonia, etc.

Nitrification.—No account of soil organisms could be complete without referring to the marvellous conversion of ammonia, first into nitrous acid and finally into nitric acid—a process known as nitrification. This can also be brought about in the laboratory under certain conditions. Evening-class students, who know the manurial difference between sulphate of ammonia and nitrate of soda, will appreciate the following experiment:—

Experiment 101.—Break up some natural chalk into pieces the size of a walnut, and soak in shallow well water (or, failing that, the turbid extract obtained by shaking soil with water, and then allowing the coarse particles to settle). Some of the organisms are taken up by the chalk. Transfer the fragments to a long tube, three feet in length, the bottom of which is stopped by a cork perforated by a glass tube. Run a 0·1 per cent. solution of ammonium sulphate, containing 10 per cent. of the culture solution without nitrogen (compare Experiment 50) gradually over the chalk, and leave for about a fortnight. The conditions favour the nitrifying organisms, but not the majority of the others; the latter either die or form spores, and the former flourish and convert the ammonia into nitric acid.

Once the tube has been made, it lasts for a long time. In class it is only necessary to allow a little of the sulphate of ammonia solution to run in at the top, and collect a few drops of the solution below. Then evaporate *just to dryness*, but do not let the dish get overheated; allow to cool, and add a few drops of diphenylamine dissolved in strong sulphuric acid. A beautiful blue colour indicates the presence of nitrate.

The Soil in its Relation to the Plant.

The function of the soil is to afford anchorage to the plant, to supply it with water and food, and to maintain a proper temperature and a suitable air supply. These separate factors have already been discussed. Experiment 70 (p. 579) has shown us the separate mineral substances essential for plant growth. It can easily be shown that they all occur in the soil.

The presence of calcium has already been demonstrated (Experiment 70, p. 91). Proof of the presence of nitrate is afforded by evaporating some soil water or shallow well water just to dryness, and applying the diphenylamine test.

Test for phosphoric acid by warming some of the soil with dilute nitric acid, and adding a solution of ammonium molybdate. A parallel test should be made at the same time with a phosphatic manure, as superphosphate, basic slag, or bones.

For iron, apply the potassium ferrocyanide test given above.

Apparatus Required.

Much of this was wanted for the earlier course, but it has been thought advisable to make the list complete.

1 Measuring cylinder, 100 c.c.
3 Thermometers, to read to 200° C.
6 Lamp chimneys, straight form, cork bungs to fit.
4 Light collars, 2 in. deep, to take chimneys, sheet iron.
4 Beakers, 250 c.c.
3 Flat-bottomed flasks, 300 c.c., 12 corks to fit; 3 of 50 c.c., 12 corks to fit.
3 Pieces wire gauze.
2 Funnels.
¼ Ounce ammonium molybdate, diphenylamine.
8 Ounces each sodium phosphate, calcium sulphate, sodium nitrate, potassium sulphocyanide, Nessler's solution, potassium ferrocyanide, ammonium oxalate, potassium chloride, ferric chloride.
1 Dozen test-tubes, corks to fit.
3 Pounds glass tubing, assorted sizes, but three pieces must be uniform, and ⅜ in. diameter.
1 Tripod.
3 Evaporating dishes.
2 Packets filter paper.
3 Glass jars.
1 Liebig's condenser.
1 Retort stand, 2 rings, and clamp.
1 Burette.
1 Filter flask.
Round and triangular file.
1 Bunsen burner and tubing, or, if there is no gas, one *good* spirit or oil lamp.

Hydrochloric and nitric acid are wanted, but these must be obtained locally, as carriage (5s. minimum) is prohibitive.

THE SIMPLON TUNNEL.

Some of our readers have during their holidays visited this marvellous piece of engineering. The difficulties encountered in boring this tunnel have been immense, and consisted not only in the vast amount of very hard rock which had to be bored and cleared away, but also the dangers which arose from the tapping of springs of water in the mountain. Some of these were hot, and some so copious that, in spite of the provision made to carry off the water, they threatened more than once to lead to the abandonment of the whole undertaking. Thirteen miles of solid rock have been pierced by a double bore since 1898, and the Cisalpine and the Transalpine worlds are now united by a third route which will materially assist commerce and international intercourse. One Swiss terminus is at Brieg in the Rhone valley, and the Italian end at Iselle. Formerly regarded as nature's bulwarks against invasion, the Alps are now considered an obstacle to be overcome in the interests of peaceful intercommunication. The new tunnel is the longest in the world; it is something over three miles longer than the St. Gothard tunnel, and four miles longer than the Mont Cenis tunnel. It pierces the rock 7,000 feet below the famous pass which Napoleon facilitated by the greatest engineering feat of his day and generation. The long, toilsome road crossing its 611 bridges, traversing numerous tunnels, and rising to a height of 6,578 feet, is now superseded by the double line of rails which pierces the mountain mass in parallel bores fifty-six feet apart, and united by oblique galleries at intervals. By means of the new tunnel Calais is now eighty miles and Ostend sixty miles nearer to Milan.

THE PRACTICAL TEACHER

For FEBRUARY

will contain a new feature, entitled

"The Modern World,"

made up of selected items of general news presented in such a way that the information can be readily used in the classroom.

Our Modern Language Section

FRENCH PRIZE COMPETITION.

RULES.

1. All translations should be **posted not later than January 8, 1907,** and addressed:—PRIZE EDITOR, Office of the *Practical Teacher*, 35 and 36 Paternoster Row, London, E.C.
2. Competitors should cut out and send the Coupon which appears on the Back Wrapper page of the current number.
3. Competitors should write pseudonym only on MS. Prize-winner will be asked to send name and address for publication.
4. No competitor may take the prize offered more than once in three months.

A Prize of Half a Guinea is offered for the best rendering into English of the following extract:—

Les passions, en effet, ne suppriment pas la volonté quoi qu'on en dise; elles la détournent seulement de son véritable objet; et si, comme je le disais, l'histoire est le théâtre des passions, elle est en même temps ce que j'appellerai "le lieu des volontés." Vous le savez, messieurs, et vous aussi, mesdames, ce n'est pas la sensibilité qui gouverne le monde. Vertu de femme ou de dilettante, elle est trop délicate, trop facile à émouvoir ou plutôt à surprendre, et par suite à tromper; elle répugne à trop de besognes; elle paralyse enfin l'action plus souvent qu'elle ne l'aide. Ce n'est pas non plus l'intelligence. Dirai-je qu'elle habite trop haut? dans une sphère trop éloignée de la vie présente? ou peut-être qu'elle discerne avec trop de lucidité le fort et le faible des choses, le pour et le contre, et que, par exemple, jusque dans l'application des principes de la justice elle trouve toujours je ne sais quoi d'injuste qui se mêle encore? Elle a d'ailleurs de quoi se satisfaire en elle-même, et je ne me rappelle pas qu'aucun Platon ait rêvé d'échanger les joies pures de la spéculation contre les voluptés, si grandes, à ce qu'il paraît, de l'action, mais toujours si troubles et si courtes! Mais la volonté, voilà la maîtresse du monde! Ceux qui veulent, ceux qui savent vouloir, ceux même, comme on l'a dit, qui ne veulent rien, mais "qui le veulent bien," voilà ceux qui nous mènent! Nous rongeons le frein qu'ils nous imposent, mais nous le subissons, et nous nous retournons un jour contre eux, nous nous révoltons, nous les renversons, mais nous les avons suivis, et nous ne remontons pas le courant qu'ils nous ont creusé.

FERDINAND BRUNETIÈRE,
"Les Époques du Théâtre français."

RESULT OF THE DECEMBER COMPETITION.

The prize is awarded to "Agonzag." (Will "Agonzag" kindly forward name and address for publication?)

First Class.—Phil, Ternan, T. V. D., Cissie, Cepta, Jan, Comet, W. P. B., Launay, Angela, Dim, Le Coq, Lemuel Gulliver, Nérée, F. M. S. W., M. L. N., Nylmat, N. D., Immaculata, Maud, 691st, Keeldees, Mergy, Meithrinva, Tyro, Winnowsty, Cornubia, Perseus, Paxton Dale, Digamma, Rus, Ceccles, Montrose, Votrem, Awa Maru, Cissy, Lytton, Wee, Germain, Amrita, C. C. F., Justitia, Kiln Barn, Holly, Raema.

Second Class.—Marcus, Cesario, E. C. A., Scotus, Michu, Désireux, Saxonne, Prix, Patsy, Gladiator, Whist, Mifanwy.

The name and address of "Devanka," the winner of last month's prize competition, are—Miss M. J. Washington Wilson, 54 Carden Place, Aberdeen, N.B.

Report.

Many very good papers have been sent in this month. Generally speaking, the errors occurred in the first half of the extract. Very few got the exact meaning of *comme un ruisseau limpide*, etc. *Comme* here is equivalent to our expression "as it were." *Tel passe*, etc., was a difficulty. The author is trying to show that all who appear to be looking at water as it flows are not solely absorbed in watching the water. *Tel* refers to any one who is looking towards the flowing water, but really absorbed in watching something else than the flow of the water. The sentence which follows pictures the man whose whole interest is taken up in watching the water itself. It was to be expected that *vertes demoiselles* would catch some; but, after all, it caught surprisingly few. "Maidens in the prime (*sic*) of youth" was one rendering. The prize editor begs to thank those competitors who sent good wishes for Christmas, which he heartily reciprocates.

Prize Translation.

There is in the appearance and sound of running water an indefinable charm. There are people who claim to be taken seriously because they talk nonsense with knit brows and are clad in garments of certain hues. They pretend to a monopoly of gravity because their childish sallies excite laughter only in their audience. These folks deem it idiotic to gaze at the flowing of water. I frankly confess it is an avocation which I find singularly fascinating, and one into which I throw myself with the greatest ardour.

Running water is a picture and a melody, making, as it were, a limpid, murmuring stream of sweet thoughts, charming fancies, and pensive memories to flow from my brain. Fewer people than is generally thought really look at flowing water. That man yonder resting his elbows for a good hour on the parapet of the bridge is busied with yon angler casting his line, or the horses drawing a boat, or the washer-women singing. But to lie down, buried, as it were, in the long, flowering grass under the bluish foliage of the willows, following with one's eye a river or a brook, watching it bend the rushes and sweep the blades of grass before it; noting the green dragon-flies that hover over the red blossoms of the flowering rushes or on the little white anemones shooting up through a great carpet of verdure, itself resembling the green locks of some Nereid; and seeing this only, listening to the rustle of their gauzy wings, and the beat of the waters against the bank, and the swish of a gust of wind through the leaves of the willows; and to hear but that and forget all else besides, and feel one's heart filled with an unspeakable joy, one's soul blossom and open itself to the sun—that is what I call looking on "flowing waters:" that is not a mere pleasure, but a happiness that I rank among the greatest it has been given me to taste in my life.

AGONZAG.

For particulars of a highly interesting English competition, open to all readers of "The Practical Teacher," see page 365.

OUR TUTORIAL SECTION

SCHOLARSHIP COURSE FOR 1906-7.

BY ARTHUR T. FLUX,

Late Principal of the Belvedere Pupil-Teacher Centre; First on Scholarship List; Author of "Scholarship School Management," "Building of the British Empire," etc.

Work for the Month.

PART II.

Now that the subjects of Part I. have been dealt with (successfully, let us hope), the student will be able to concentrate his attention on the very important subjects in Part II. The greater part of the work has been covered; it remains only to make the final preparation complete and perfect. For this purpose we shall give each month test papers, which have either been set or which are composed for the greater part of government examination questions. The student should answer these in the time allowed, and have them examined by a competent critic.

1. *English Grammar and Literature.*—Work for the month.

(*a*) Rules of punctuation.

(*b*) Abbott and Seeley—Part III., Chapters ii. and iii.

(*c*) Read *Henry the Fifth.*

(*d*) Next twenty poems in *The Golden Treasury*, or any good collection of poems.

(*e*) Read any or all of the following—*Old St. Paul's* (Ainsworth), *Esmond* (Thackeray), or the *Cornet of Horse* (Henty), *Old Mortality* (Scott), *Micah Clarke* (Doyle), Pepys's *Diary.*

Notes.—(*a*) The rules for punctuation are generally given in a good text-book, but are not usually studied. It is difficult to lay down exact rules as to when to use stops, and when not. Authorities differ very widely in their use of them; but the student should know at least the rules for their use whereon all agree.

(*b*) The chapters in Abbott and Seeley for this month are straightforward and interesting. They discuss the varieties of disyllabic and trisyllabic verse. If the student is not quite familiar with the names and terms employed, he would do well to revise the work for last month, and devote some time to practising scansion of the various poems in the anthology of verse which he possesses.

(*c*) *Henry the Fifth* differs very widely from any of the plays we have already considered. It is not a comedy, nor a tragedy, but the representation of a triumphal progress of the English, the march of the national army, headed by the king, who was Shakespeare's hero, illustrated by side lights on the camp life, the incidents of battle and siege. As a history it is fairly correct; but there is no plot or impending disaster—nothing of the inevitable tragedy which dominates *Macbeth.* To appreciate the play properly, one has to look at events from Shakespeare's point of view. He, in common with his contemporaries, had seen England rise from an unimportant place to the forefront of nations—from the depths of religious hatred and poverty to peace, content, and prosperity. France was glad to be an ally; the power of haughty Spain was crushed in the dust; the new world was opening to English navigators and merchants; and it is not to be wondered at that there was a feeling of exaltation in the hearts of all true Englishmen, which led them, perhaps, to hold all others rather cheaply. Their pride of race—a commendable fault at all times—led them to picture England as the all-triumphant. In selecting a hero which would not only please himself, but also prove attractive to the minds of his audience, the author could not have made a better selection than the fighting King Henry the Fifth. The invasion of France, the brilliant victory of Agincourt, the marriage with the French princess, and the immediate prospect of mounting the French throne, would appeal powerfully to the people. The facts of history provided something better than his imagination could have produced, and he undoubtedly regarded Henry the Fifth as the greatest national hero. Bearing these points in mind, we might expect to find, as indeed we do, the English side a little exaggerated, and the French correspondingly depreciated. The bragging of the dauphin is meant to be a foil to the earnest, brave, and manly address of the English king to his troops.

The character of Henry the Fifth is naturally complex. Shakespeare had shown him as the riotous youth, the associate of boon companions, including that dear old rascal, Sir John Falstaffe. He now depicts him as a king capable of high and kingly feeling and of stern self-restraint. The four points which are usually selected as being blemishes in his character are his challenge to the dauphin, his march to Calais, the massacre of the prisoners at Agincourt, and the treatment of the inhabitants of Rouen. But these points must be considered from the point of view of the fifteenth century, and not the twentieth. A challenge to personal combat was a usual way of settling disputes; there was a real belief that God gave the victory to the man who was in the right. The march to Calais was a daring step, and could only be justified by the success which attended it. Like many a brilliant move in other battles and wars, it can only be applauded after victory. If defeat had come, there must be wholesale condemnation. The massacre of the prisoners, and the treatment of the people before the walls of Rouen, were in keeping with the times, when there was no Geneva Convention, and when life was held cheap. The serious side of the play is relieved by those humorous characters which Shakespeare alone knew how to create.

(*e*) Ainsworth's *Old St. Paul's* gives some idea of London life at this period. *Esmond* gives the reader a splendid description of Marlborough's campaigns, varied by scenes at the English court. Henty's *Cornet of Horse* gives also a true account of the battles, and will be preferred, perhaps, because it is easier reading. *Old Mortality*, the best, perhaps, of Scott's works, deals with the state of Scotland, and especially with the Covenanters. No one could read this book and fail to understand very clearly the points in dispute, the views taken by the opposing parties, the causes of the Covenanters' defeat, and the character of the famous Graham of Claverhouse, Viscount Dundee. In *Micah Clarke* a fine picture is presented of the Monmouth rebellion, and the book should be read by all.

Pepys's *Diary* is a literary curiosity. As chief of the Navy Office under Charles the Second, Samuel Pepys was in close contact with London and court life. Fond of music and society, inquisitive, pleasure-loving, ambitious, and a good business man, he jotted down in a shorthand of his own invention, and for his own pleasure only, the gossip of the times and his own personal proceedings. Written with no view to publication, it is a wonderfully true picture; for he has included items such as the price of his dinners, of his clothes, his coach, his wife's gowns, which the serious historian would have considered too trivial to notice, yet which are of fascinating interest to us. He was in London at the time of the plague, carried the news of the commencement of the great fire to the court, superintended the fitting out of the fleet, and defended his office before the Commons with credit to himself and colleagues. He discontinued his diary through trouble with his eyes, and the diary at his death was placed in a library, where it remained unnoticed till the beginning of last century. The student should certainly read some part, if not all, of this most interesting book.

TEST PAPER ON ENGLISH. (Time about 2 hours.)

"Thus with the year
Seasons return; but *not* to me returns
Day, or the sweet approach of even or morn,
Or sight of vernal bloom, or summer's rose,
Or flocks or herds, or human face divine;
But cloud *instead*, and everduring dark
Surrounds me, from the cheerful ways of men
Cut off, and for the book of knowledge fair
Presented with a universal blank
Of nature's works, to me expunged and rased,
And wisdom at one entrance *quite* shut *out*."

(1.) Divide the above into its component sentences, and indicate their relation with each other.

(2.) Parse the words in italics.
(3.) Express the above in your own words. (It is part of Milton's lament on his blindness.)
(4.) Point out any words in the above you recognise as being of classical origin, and, if you can, give the root.
(5.) Scan the last four lines. What name is given to this particular kind of verse?
(6.) Discuss the character of Henry the Fifth as presented in the play.
(7.) State the source of six of the following quotations. Say who the author was, in which century he lived, and give the name of the poem in which the lines occur:—

(*a*) Such is the patriot's boast, where'er he roam
His first best country ever is at home.
(*b*) Her march is o'er the mountain waves,
Her home is on the deep.
(*c*) Oh that those lips had language.
(*d*) The evil that men do lives after them,
The good is oft interrèd with their bones.
(*e*) Faithful below, he did his duty,
And now he's gone aloft.
(*f*) A Daniel come to judgment.
(*g*) Now that I do not know, said he,
But 'twas a famous victory.
(*h*) Our birth is but a sleep and a forgetting.

(8.) Distinguish between the meanings of:—

(*a*) Obedient, submissive, and obsequious.
(*b*) Fallacious, deceitful, fraudulent.
(*c*) Impervious, impassable, inaccessible.
(*d*) Frank, candid, and ingenuous.
(*e*) Rapacious, ravenous, and voracious.

ESSAY. (½ hour.)

Write an essay of thirty or forty lines on one of the following:—

(*a*) Socialism.
(*b*) Literature and the drama as means of education.
(*c*) Arctic exploration and its difficulties.
(*d*) Trusts.

(*a*) Define the term as carefully as you can. Distinguish between the various creeds which come under the term, and state the pros and cons from your point of view.
(*b*) In other words, can books or plays educate and influence people? If so, to what extent, and in what way.
(*c*) Point out the peculiar difficulties—cold, difficulties of locomotion, absence from supplies, etc.
(*d*) Explain the term. Show why they are formed, how they operate, and what the effect is upon the general consumer.

2. *History.*—1660–1714.

The return of the Stuarts to the throne did not undo all that had been effected by the great struggle for political liberty. The exuberance expressed at Charles's return was due partly to the deep-seated respect for the monarchy which has always characterised Englishmen, and partly to the joy of being emancipated from the gloomy Puritan yoke. The first Parliament proceeded to repress by legislation the growing dissent from the Church, and passed the famous Clarendon Code, comprising the Corporation Act, which ensured all the municipal officers being churchmen; the Conventicle Act, to prevent the dissemination of Nonconformist teaching; the Five Mile Act, a kind of local banishment for preachers from places where they were known; the Act of Uniformity, compelling all churchmen to adopt the Prayer Book in its entirety.

The Great Plague and the Great Fire must be studied, as throwing light on the life of the times.

Charles, the Merry Monarch, endeared himself to the people by his debonnair manners; but he was a Stuart, and although he did not directly oppose his will to the people's—"he did not want to go wandering again"—he nevertheless acted as arbitrarily as his father, but more warily. His answer to the famous epigram—

"Here lies our sovereign lord the King,
Whose word no man relies on;
Who never said a foolish thing,
And never did a wise one"—

was that it was perfectly true, since his words were his own, but his acts were his ministers. But this was hardly correct. Charles's ministers acted under his instructions, and when popular indignation became too hot they were sacrificed to appease it. Thus Clarendon was dismissed to allay the feeling caused by the Dutch successes; Buckingham and Arlington from a similar cause; Danby for the secret treaty of Dover. "No man ever trusted the Stuarts but it was to his own ruin." Charles was perfectly ready to sell himself to the French king, and, no doubt, would have welcomed any combination which freed him from the control of Parliament; but the common sense of the people prevented ministers and Parliament from erring too far. Notwithstanding the Triple Alliance formed by Temple between England, Holland, and Sweden in 1668 against the power of France, the secret treaty of Dover (1670) stipulated that (1) England should join France in attacking Holland; (2) Charles should support Louis in upholding his wife's claim on the Spanish succession; (3) Charles should receive £200,000 a year; and (4) that an extra annuity of the same amount should be paid Charles if he declared himself a Catholic, and re-established Catholicism in England.

The alarm felt when these terms were divulged led to the passing of the *Test Act*. In 1679 was passed the famous *Habeas Corpus Act*. Under the terms of the Magna Charta it was stipulated that a man should not be imprisoned without due trial, etc.; but there was no penalty attached to breaking this, and hence a man could be arrested and kept in prison indefinitely without trial. This famous Act rendered it illegal, and provided that a man must be produced for trial as soon as possible under very heavy penalties on the judge and jailer if this were not done.

James the Second, a professed Catholic, possessed all the failings of the Stuarts. Of more determination than his easy-going brother, he soon drove matters to a crisis. His ill-advised public sympathy with the Catholics brought about the Monmouth invasion in England and the Argyll rising in Scotland, both resulting in useless loss of life. The Bloody Assize under Jeffreys in the west country prepared the way for the exile of the king.

James further exasperated the people by his claim to the Dispensing Power—that is, as king he claimed the right to dispense with laws at his own free will—and a servile Parliament supported him in his belief. The Declaration of Indulgence, which suspended the penal laws against Catholics and Nonconformists alike, was bitterly opposed, especially by the latter, who recognised that if they accepted the welcome relief offered them, they were tacitly admitting a power which they at all times refused to acknowledge.

The further details must be read up. James successfully turned the hearts of all his subjects against him, and was left friendless.

William and Mary.—The "glorious Revolution" was effected without bloodshed, and was the means of securing to the people privileges which had been in dispute for centuries. The Declaration (afterwards Bill) of Rights defined exactly the relation between king and people, and made clear what had previously been hazy and doubtful. It is of the utmost importance to notice the great political changes which arose from the Revolution.

(1.) The king could not (*a*) levy taxes, (*b*) suspend or dispense with laws, (*c*) levy troops or keep a standing army in time of peace, or (*d*) create courts for ecclesiastical purposes, without the consent of the Parliament.

(2.) The people have a right (*a*) to freedom of election, (*b*) to petition the king on any subject, and (*c*) to have justice and freedom of debate.

(3.) The establishment of the principle of Appropriation of Supplies. In the past the king had received all moneys collected, and had spent them on what objects he thought fit—himself and his friends usually coming first. This was now altered, a definite sum being voted to the king for the privy purse, etc., and all moneys raised for a particular object to be used for that object and no other. This obtains till the present day. Money which the Parliament votes for the navy cannot be expended on the army or some other branch of the service.

(4.) Government by party. It soon came to be recognised that the ministry should consist of the leading men of the party in power, as without a majority to support them they could carry out no important legislation; and as a result of this, again came the principle of ministerial responsibility. When the Dutch fleet sailed up the Thames there was no one upon whom blame could be fastened; but now the minister in charge of any Government department is responsible to the people for all that is done by that department.

(5.) *The Mutiny Bill*, which allowed a standing army for *one* year only, gave the control of the forces into the hands of Parliament, for unless they passed the Bill every year, the army automatically dissolved.

(6.) *The Bank of England and the National Debt.*—Another important institution arising out of the Revolutionw as the establishment of a National Bank—a bank whose integrity is guaranteed by the State—and the commencement of the National Debt. Monarchs previously had borrowed on their own security, and the repayment of these loans often meant heavy taxation. William's position was so insecure, and coupled with this the fact that he was not allowed to finance the State, that it became

necessary for the *State* to borrow, the security being the guarantee of the nation. It was soon found that money could be easily raised on these terms; and it was also found convenient to delay the repayment by spreading it over a long period. This is correct in principle. If lasting benefits are to be derived from any unusual expenditure, it is only fair that the cost should be shared by all who will benefit—the present and future generations. This principle is now everywhere recognised. If a town has to build a school, it is only fair that the cost of it should be shared by the inhabitants for thirty or forty years. The debt of England has increased enormously. At the end of William's reign it was £16,000,000. The War of the Spanish Succession added £38,000,000, the American War added £121,000,000, and the wars with Napoleon, when England was financing Europe against him, raised the total to £900,000,000. Although the debt has been reduced, it is still over £700,000,000.

The reign of Anne, as far as foreign affairs were concerned, is concerned mainly with the War of the Spanish Succession. The points at issue must be clearly understood. The whole of William's foreign policy was to curb the growing power of France, the only Continental power which was formidable. Spain was sinking in power, Italy was a mere collection of states, Germany the same, Russia was a negligible quantity. The French king, Louis the Fourteenth, whose saying, "L'état, c'est moi!" indicates his attitude with respect to his own rule, was a man of unbounded ambition. He was a friend of the Stuarts, and was quite willing to help them back to the throne of England.

Charles the Second of Spain was old and childless. The next heir to the throne was the grandson of Louis, although all claim to the Spanish throne had been repudiated on the marriage of Maria Theresa to Louis. The next heir was the Electoral Prince of Bavaria, and the next the Archduke Charles. The first Partition Treaty, brought about by William, arranged for the succession of the Prince of Bavaria, and on his death the second Partition Treaty gave the Spanish throne to the Archduke Charles. On the death of Charles the Second of Spain, Louis threw all treaties to the winds, and accepted the throne for his grandson Philip, who became Philip the Fifth.

War was at once declared. The danger to England was great. France and Spain united in this way ("There are no longer any Pyrenees," said Louis) could dictate terms to England, and overrun Holland. To preserve the balance of power, and to prevent the Stuarts being seated on the throne by force, England, Holland, and the Emperor entered into the Grand Alliance.

Owing to the splendid victories of Marlborough—Blenheim, Ramillies, Oudenarde, Malplaquet—the power of Louis was broken. The Treaty of Utrecht recognised Philip as King of Spain, on the stipulation that the two crowns should never be joined, and the French promised to banish the Stuarts and yield them no further support.

A plan of Blenheim must be learnt.

The legislative union with Scotland in 1707 must be studied.

The affair of Dr. Sacheverell is often misunderstood. A man of little ability, he foolishly attacked the Whig principles in a sermon preached before the Lord Mayor. The Whig Government, more foolishly, determined to impeach him; and as the feeling in the country was in favour of the Tories, his trial became a party struggle, and the failure of the Whigs to secure a heavy punishment brought about their downfall.

George the First.—The chief points to be mastered are:—

(1.) The succession. Prepare a genealogical table showing his descent.

(2.) The Riot Act.

(3.) The Jacobite Rebellion of 1715.

(4.) The South Sea Bubble.

(5.) The affair of Wood's Halfpence.

The only point which needs explanation is the South Sea Scheme, which is often misunderstood. The prosperity of the East India Company led to the formation of a company to trade in the South Sea—for example, the Pacific and coasts of America. This was a sensible idea, and would be a profitable undertaking, provided the company obtained a charter to give them the exclusive right. They did this by taking over seven and a half millions of the National Debt, or, in other words, they paid this amount for the exclusive right. This was the first mistake. To pay the interest on this would need an enormous profit, more than the company could hope to make. The prominence given to the deal, and the absurdly wild promises of the directors, led to the rush to invest in the shares. The £100 shares were sold for £1,000. Rival companies sprang up, and when one of these was exposed, the reaction affected the South Sea Company, and the crash came. Every one was blamed except the chief culprit—the English public, which ought not to have been so stupid as to speculate wildly. These points must be remembered:—

(*a*) The opening was a genuine one. After the crash the £100 share was sold for more than its face value.

(*b*) The undertaking was over-capitalised.

(*c*) The money received was recklessly squandered instead of being used for trading purposes.

Citizenship.—Chaps. xv.–xviii. Peaker's *British Citizenship*; the Admiralty; the War Office; Foreign, Colonial, and Indian affairs; the Privy Council.

Special Period.—Victoria, 1854–1860.

The two chief points in this period are the Crimean War and the Indian Mutiny. The Crimean War was undertaken to protect the Turks from the Russians. The Russian emperor had claimed the right of protecting all Greek Church Christians and regarding them as his subjects, and had invaded Turkey. The home government tried to bluff him, and sent troops out to the East as a demonstration, and not with the serious intention of fighting. When they found themselves actually engaged in war, the troops were utterly unprovided with the necessary material. The whole of the war brings out clearly two things—(1) the magnificent bravery of the soldier and his officers; and (2) the crass stupidity of the Government and the generals responsible for the operations. After the battle of the Alma (itself a blunder, for a frontal attack was made where a turning movement would have been as effectual, with much less loss of life) the army might have marched into Sebastopol. Instead of this it camped, and allowed the Russians to fortify. The camp was badly placed; the men were not well protected and fed; stores were destroyed through carelessness; the wounded were far less happy than the dead. The incidents which are creditable are (1) the charge of the Light Brigade—"magnificent, but not war"—due to another blunder; (2) the charge of the Heavy Brigade, due to the inexperience and blundering bravery of a general who had never fought before; (3) the battle of Inkerman—the soldiers' battle—destitute of any generalship at all, where the men fought as they liked, charging through the fog at the gray-coated Russians, twenty sometimes tackling two thousand, waging a fight for hours over a redoubt that was useless to either party, blundering through with the reckless daring of the British soldier, and with his usual luck.

Two names stand out boldly in this campaign—one that of General Todleben, the Russian engineer, who made Sebastopol well-nigh impregnable; the other, Florence Nightingale, "the lady of the lamp," the delicately-nurtured lady who took charge of the putrid hospitals at Scutari, swept them clean of filth and mismanagement, reduced the death-rate from 60 per cent. to 2 per cent., quietly overruled or ignored red-tape and official blundering, and raised nursing to one of the highest and noblest of arts.

The Indian Mutiny was produced by a variety of causes most of them due to ignorance and misgovernment:—

(1.) The number of Sepoys or native soldiers was far too great in comparison with the number of white troops.

(2.) The Sepoys were placed in charge of the munitions of war!

(3.) The Company had wounded the susceptibilities of the people, and by their wholesale annexations had created a fear in all the remaining independent states.

(4.) The greased cartridges were the immediate cause, but not the main cause.

(5.) The belief, sedulously fostered, that English rule would last only one hundred years from the battle of Plassey, 1757.

The results were good. The government was assumed by the Government of England—a new era of strong but just rule ensued, no more annexations were made, but the country was governed for its own good, and not exploited to produce a revenue.

Test Paper. (1½ hours.)

(1.) "The Norman kings and the English subjects found that they had a common interest in opposition to the Norman baronage." Justify the statement from the events in the Norman period.

(2.) What connection do you trace between the Black Death, the Statute of Labourers, and the Peasants' Revolt?

(3.) Mention some of the administrative reforms introduced by the Anglican kings.

(4.) Write five or six lines about *four* of the following—John of Gaunt, Sir John Oldcastle, William of Wykeham, Sir Thomas Wyatt, Sir Francis Drake, John Bunyan, Titus Oates.

(5.) What do you understand by benevolences, monopolies, suppression of the monasteries, Exclusion Bill, Appropriation of Supplies?

(6.) Describe in detail the process of making an Act of Parliament.

3. *Geography.*—Work for the month.

(1.) Physical: the atmosphere; composition; density and pressure; barometer; height; temperature; winds; trade winds; monsoons; land and sea breezes; hurricanes and cyclones; methods of forecasting the weather; clouds; rain, its distribution; snow; hail; glaciers; moraines; icebergs, etc.

(2.) Austria and the Balkan Peninsula.

(3.) Revise the geography of Africa.

Notes.—(1.) The text-book will supply all the necessary facts on the physical geography, which is an important section this month. Trade winds, monsoons, land and sea breezes must be carefully prepared. The method of forecasting the weather is simple to understand. A map of Western Europe is taken, and the reading of the barometer at as many places as possible at the same time marked upon it. Lines are drawn connecting all places with the same barometric pressure. These lines are isobars, and usually take the form of concentric curves. If the figures showing the pressure increase from the centre outwards, the condition is called a cyclone; if *vice versâ*, an anti-cyclone. In either case there is a tendency for the air to flow so as to equalise pressure. This it does with a spiral motion—in the case of a cyclone towards the centre in a direction contrary to the hands of watch; in the case of an anti-cyclone, outwards in the opposite direction. If the gradient is steep—for example, if the lines are near together—the wind blows strongly; if they are far apart, very slowly. Having discovered the probable direction of the wind, it is easy to add further information: for example, if the wind is likely to blow from the south-west over England, it is very likely to bring rain.

(2.) In preparing these countries pay special attention to the *essential*—productions, industries, imports, exports, government, etc. Use sketch map wherever possible. Tabulate into notebooks for future revision: for example—

Balkan States.	Population.	Imports.	Exports.	Towns and Government.
Bulgaria.....	1 million.	Textiles, metal goods and machinery, leather, oils, paper, rice, coal.	Wheat, live stock, essence of roses, woollens, skins, timber.	Sofia, Philippopolis. Created a Principality by the Treaty of Berlin. Eastern Roumelia joined it in 1886.
Crete.....	300,000.	Manufactured goods.	Wheat, fruit, wool, olive-oil, cheese.	Administered by a High Commissioner acting under the Great Powers.
Greece.....	2¼ millions.	Cotton and other manufactures, corn, timber, sugar, fish, salt, coal.	Currants, figs, olive-oil, tobacco, marble, sponges.	Limited monarchy. Independence established in 1830.
Montenegro.....	¼ million.	Do., do.	Maize, potatoes, sardines, cattle.	Principality. Independence recognized by the Treaty of Berlin, 1878. Cap. Cettinje.
Servia.....	2¼ millions.	Cottons, sugar and colonial goods, hardware, woollens.	Prunes, pigs, wool, wheat, wine, hides, cattle.	Kingdom. Established by the Treaty of Berlin, 1878.
Turkey.....	6 millions.	Cotton and woollen goods, machinery, colonial produce.	Tobacco, fruits, silk, opium, coffee, skins, wool, carpets.	Despotism under the Sultan, whose proclamations are law.
Roumania.....	5¼ millions.	Manufactured goods of Western Europe.	Wheat, barley, maize, rock salt, spirit, hides, wood, cattle.	Limited monarchy. Established by the Treaty of Berlin.

The provinces of Herzegovina and Bosnia are administered by Austria, and are now usually included in the empire.

(3.) The chief points to attend to in the revision of Africa are indicated by the questions set (see *Test Questions in Geography*, Meiklejohn and Holden). The student must get a clear idea of the various states and their government (the latter is very varied). The partition of Africa amongst the European Powers is an important point. In view of recent disclosures, particular attention should be paid to the Congo Free State. It came into existence owing to the discoveries of Sir H. M. Stanley. An International Association was founded at Brussels under the presidency of the King of the Belgians in 1876, and the country has been mainly administered by Belgian officials, and exploited by the king for his own personal profit. The productions are mainly rubber (three-fifths of the whole), palm kernels, palm oil, and ivory; and under the pretence of collecting these from the natives by commerce a system of wholesale slavery has been established. The natives have in many cases been treated most cruelly, and it is highly probable that the Great Powers will have to intervene in the matter.

Test Paper in Geography. (1½ hours.)

(1.) Where and what are the following—Bornholm, Rigi, Dalmatia, Bremen, St. Gothard, Dunkirk, Milan, Palermo, Abo, Brindisi?

(2.) What geographical reasons can you give why some countries excel others in industrial and manufacturing enterprise? Select instances among the countries of Europe.

(3.) "Europe may be divided as regards its vegetation into four horizontal and four vertical zones." Comment on this statement.

(4.) How may it be determined by measurement that the earth is not spherical? Why is the solar day an unfit measure of time? What is the mean solar day?

(5.) Explain the cause of land and sea breezes. Describe briefly the cause and course of the equatorial current.

(6.) What are the chief products of Central America? Give a list of its seaports, and mention any circumstances that have retarded its commercial development.

4. *Elementary Science.*—For this month prepare light, propagation of light, shadows, photometry, laws of reflection and refraction, with reference to plane surfaces, prisms, and the spectrum. The following are questions set in recent years:—

(1.) In a shipbuilding yard a machine pierces holes in iron plates by punching out circular fragments. Before beginning work the machinery and iron plates are quite cold. After the operation the circular fragments are too hot to hold in the hand. Why is this? How could you ascertain experimentally the amount of heat gained by one of the fragments during the process?

(2.) By what properties do you recognise a solid substance? What reason have we for thinking that sealing-wax does not belong to the class of solid substances?

(3.) On a hot summer day, immediately after a rainstorm, a block of ice on a cart appears to be "steaming." Explain this phenomenon.

(4.) When are colours said to be complementary? Show how you would devise an experiment to test whether any given set of colours were complementary. Name a pair of tints which are complementary.

(5.) A small hollow metal float is found to contain some liquid. There is only a very minute hole in the bottom through which the liquid could have entered. Explain how the liquid probably got into the float, and how you could quickly expel it without enlarging the hole or injuring the float.

(6.) How would you determine experimentally the centre of gravity of an irregular thin sheet of metal? What further experiment could you make to satisfy yourself about the result?

(7.) How would you find the internal and external volume of a small glass bottle, and also the volume of the glass?

(8.) A heavy plummet is immersed in a stream, the string being held by a man standing on a bridge. The string is found to settle in a sloping direction. Show by means of a sketch the three forces which keep the plummet in equilibrium, and also represent them by the three sides of a triangle.

(9.) If you see some one reflected in a looking-glass, would you also be seen by him? Justify your answer, giving a diagram.

(10.) Certain natural waters contain carbon dioxide. Give two methods by which it may be removed. Why is it desirable to remove it in certain cases?

5. *Mathematics.*—

(*a*) *Arithmetic.*—Square and cube root. Areas of squares. Right angles, triangles, and rectangles.

(*b*) *Quadratic Equations.*

(*c*) *Geometry.*—General practice in geometrical problems.

(*d*) *Euclid.*—Book III., Props. 3, 14–16. With four deductions each week.

Work the following:—

(1.) I invest l pounds at x per cent, m pounds at y per cent., and n pounds at z per cent. What is the income obtained from these investments, and what is the average percentage on the total money?

Ans. $\frac{lx + my + nz}{100}$; $\frac{lx + my + nz}{(l + m + n)}$.

(2.) Divide $(a + b)^3 + 1 - 3ab(a + b + 1)$ by $a + b + 1$.

Ans. $a^2 + b^2 - a - b - ab + 1$.

(3.) Simplify $\frac{(x - 3)(x^2 - 10x - 4) + (x^2 - 27)}{(x^2 - 9)(x - 1) + (x^2 - 1)(x - 3)}$.

Ans. $\frac{2x - 5}{2(x + 2)}$.

(4.) Solve (*a*) $\frac{x + y}{2} + \frac{x - y}{3} = 26.$

$\frac{x + y}{4} + \frac{x - y}{9} = 11.$ Ans. $x = 32.$ $y = -4.$

(*b*) $\frac{x^3 - 1}{x^2 + x + 1} = 1.$ Ans. 2.

(*c*) $\frac{27}{x + 2} - \frac{16}{x + 1} = 1.$ Ans. 1 or 7.

(5.) From a given point draw a straight line to equal a given straight line. If the given point does not lie on the given line or given line produced, show that there are eight ways of drawing the figure.

(6.) If from the two ends of a side of a triangle there be drawn two straight lines to a point within the triangle, then these straight lines shall be less than the other two sides of the triangle, but shall contain a greater angle. When the internal point is situated on a side of the triangle, this proposition becomes equivalent to two of Euclid's theorems. Give their enunciations.

(7.) D is the middle point of a line BC. P is any point, such that the straight line PD is greater than BD. Show that the angle BPC is an acute angle.

(8.) D is the middle point of the side BC of a triangle. The lines DF, DE are drawn parallel to CA and AB, and to meet AB and CA in F and E. Show that FE is parallel to BC.

(9.) A cricket pitch is 22 yards long. The lines joining the position of the man fielding at point and of the wickets form a triangle with angles of 90° and 40° at the wickets. Draw a diagram showing this, and measure the distances of the fielder from either wicket.

(10.) Draw a circle with radius equal to four centimetres. Take a point A on the circle, and draw a tangent AT to the circle. Draw a second tangent TB, such that the angle ATB may be 30°.

(11.) Construct a rectangle with one side given and equal in area to a given rectangle.

(12.) AB are two points 16 metres apart on the straight bank of a river. The angles CAB, CBA measure 51° and 55°. Draw to scale one-hundredth of full size the triangle CAB, and hence determine the width of the river at C.

OUR CERTIFICATE COURSE FOR 1907.

BY GEORGE COLLAR, B.A., B.SC.,
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Test Questions on last Month's Work.

Principles of Education.

1. How may history be employed in school to train and discipline the imagination?

2. Trace the interdependence of history and geography in the elementary school curriculum.

English Literature.

1. What do you consider as the chief merits of Addison as a prose writer? Sketch two characters, other than Sir Roger himself, from the *Coverley Papers*.

2. What object do you suppose Shakespeare had in introducing the working men's play in the last act? To what extent would you justify the introduction?

3. Criticise on your own lines Shakespeare's use of supernatural beings in this play, and compare it with any other play in which he has done the same.

4. Explain Hippolyta's opinion (V. i. 23–27)—

> "But all the story of the night told over,
> And all their minds transfigured so together,
> More witnesseth than fancy's images,
> And grows to something of great constancy;
> But, howsoever, strange and admirable."

English History.

1. Give a short account of *three* of the principal statesmen in the reign of Elizabeth, stating shortly their aims and methods. How did Elizabeth treat her ministers?

2. Mention some flagrant instances of the queen's duplicity and parsimony. How do you account for her popularity in spite of these failings?

3. What causes combined to make England more Protestant, in spite of Elizabeth's spirit of compromise? Trace the growth of Puritanism during her reign.

Geography.

1. Illustrate the advantages which Great Britain derives from having seaports on the east, south, and west coasts respectively.

2. "Great Britain should be divided into its natural regions as determined by the relief of the land, and each region should be treated separately." Draw up a short scheme of lessons based on this statement.

Arithmetic.

1. A tradesman buys milk at 11d. a gallon, and after diluting it with water sells it at 3½d. per quart, making a profit of 50 per cent. What proportion of water did he add to the milk?

2. By selling articles at 6s. 6d. each, a dealer makes a certain percentage of profit; on increasing the price to 7s. 1d., his percentage of profit is increased by 10. What profit is he making at the latter price?

3. A tradesman sells cloth at 10s. a yard, making a profit of 8 per cent. on the cost price; if he sold the same cloth at 10s. 6d. per yard, what percentage of profit would he then make?

Algebra.

1. Find the factors of each of the following expressions:—

$x^3 - 1$, $x^2 - 6x - 7$, $x^3 - 3x^2 + 2x$, $3x^2 - 7x + 2$.

What is their L.C.M.?

2. Find the G.C.M. of $x^4 - x^2 + 16$ and $x^3 - 5x^2 + 10x - 8$, and also their L.C.M.

Geometry.

1. Prove that any chord of a circle is bisected by the diameter which is perpendicular to it. In a circle of 1 inch radius place a chord of length 0·8 inch parallel to a given line. Explain your construction, and prove that it is correct.

2. Define a tangent to a circle, and from your definition prove that the tangent is perpendicular to the radius drawn to the point of contact. Deduce from this that if two circles touch, either internally or externally, the line joining their centres passes through the point of contact.

Elementary Science.

1. State the principle of Archimedes, and give experiments by which it can be illustrated.

2. Describe how you would find the specific gravity of a hollow glass ball such as are hung on Christmas trees.

Notes and Syllabus for January.

English Composition.

Prepare essays on the following subjects:—

(1.) The pleasures and the troubles of gardening.

(2.) The best methods of exercising thrift.

(3.) The effect of geographical conditions on national character.

(4.) "Sweet are the uses of adversity."

Principles of Education.

Prepare chap. xi. in Collar and Crook's *School Management*, and read very carefully the recent article by Mr. Unstead on the subject of teaching geography in *The Practical Teacher*.

There are few subjects in the teaching of which greater progress has been made than in geography. In the first place, the apparatus employed has improved. The maps of to-day are greatly in advance of those used twenty or thirty years ago, although the best maps are not so extensively used as they should be. Maps showing relief are much more common than

formerly, and many teachers take great pride in constructing maps in actual relief for themselves. The action of nature in moulding the surface of the land is shown by means of sand trays or clay models. All this helps to train the imagination of the children and enable them to form ideas of physical features and facts which they could not do without this help. This side of geography teaching is extremely important in the lower classes. In the upper classes attempts should be made to connect cause with effect, and so train the reasoning powers. The connection between climate and productions is a very obvious one. Certain plants require a hot climate, and therefore are not found in countries that have a cold one; others can stand a fairly hard winter, but require a hot summer to bring their fruit to perfection; whilst others, again, are killed by a slight frost.

Enough attention is not usually paid to the connection between the habits of animals and their surroundings. Children will all have noticed how cows like to stand in ponds and streams, while sheep avoid such places, except when they go to drink, and they have a fancy for high and dry ground. Hence damp and low-lying countries are relatively better suited for dairy work, and so we find butter an important export from Ireland and Denmark. But as sheep thrive better on high land, we find our best sheep in hilly districts, as the South Downs, Hampshire Downs, Cheviots, and Cotswolds, while the flesh of the Scotch sheep commands the highest prices in the London market. Thus we see that the agriculture of a district depends upon its physical condition, even in such a matter as whether the farmer should raise sheep or cattle.

There are few exercises in teaching geography which are more profitable, especially with the upper classes, than that of tracing the causes which have led to the rise and importance of towns, as well as the choice of their site. The most common object for which towns are founded is trade. Occasionally a town is founded in a conquered country as a habitation for a garrison, although even in that case a commercial town generally formed the nucleus. The Romans founded many such towns, and called them *colonies*: compare towns in England whose names end in *coln*. Notice how many provincial towns depend for their actual existence on the weekly market. There is no other means by which the town can gain anything — no manufactures or anything of that kind. Goods are brought into the town and sold at a profit, a good part of which is spent in the town and maintains the inhabitants. Some places depend on the attractions they offer to holiday-makers, who bring into the town the money that maintains the inhabitants. These towns must be situated at the seaside or some other attractive place. The situation of some towns depends on the ease with which they may be defended: compare Sarum, or Salisbury, which was originally built at the top of a hill about three miles north of the present city. But when the necessity for defending the town against military attacks ceased to be felt, the inhabitants gradually left it, and settled in the valley on a site which offered more conveniences for traders.

Among places most suitable for trade the first place must be given to seaports. Point out that carriage by sea is comparatively cheap, and when a ship leaves a port it is able to travel in any direction to any other port. But point out that places may be on the coast but yet not be seaports—there must be a good harbour. If there is a good natural harbour, so much the better; if it is inferior, it can be improved (for example, Dover) if the place presents other advantages which may make the cost of improvement worth while. But it follows that a port must meet a necessity; there must be a district farther inland which produces goods to send away through the port, and whose population will consume the goods imported at it. Such a district is called a *hinterland*. Show the importance of the hinterland as affecting the development of a port in the case of London, whose vast population, with its myriad industries, forms a hinterland in itself; Liverpool, with South Lancashire as its hinterland; Hull and Goole, with the cloth district of Yorkshire as its hinterland; Cardiff and Newcastle, backed by the populous coalfields; and Hamburg and Antwerp, which form the outlet for Belgian manufacturing towns and those of Western Germany. Next deal with the *entrepôt* trade—that is, the importation of goods from one country for the purpose of re-exporting them to another. This is promoted by the presence of numerous ports within easy access. It also increases with the general trade of a port. Thus a merchant at one port may not find a ship going direct to the port to which he wishes to send goods; but if he can rely on one going from another, he will first dispatch his goods to the latter port. For example, a merchant in Calais might not find a ship going from Calais to Melbourne for several months; but if he sends his goods to London, he can rely on finding a ship that will take them to Melbourne in a very short time. So the port of London not only has a good harbour, but a large and populous hinterland, extending right into the midland counties. It is also within easy distance of the most important ports in the west and north-west of Europe, and the trade arising from these two causes still further develops the *entrepôt* trade. It is an interesting fact that the mails between some of the South American ports come through London, although the distance is about six times as great as if they went direct.

With regard to inland towns, show the importance of the navigability of a river. Some are situated at the point at which a river becomes navigable (compare Ulm on the Danube, Ripon, York, Norwich, and Guildford), or at the confluence of two rivers (as Coblenz, Reading, Newport, and Tewkesbury), or at a point where the direction of a river changes. Goods can be brought in the required direction by the river to that point, then they must be landed and conveyed by land. This accounts for the position of such towns as Basel, Maidstone, and Lincoln. Others are situated at places to which traffic is made to converge in order to cross a natural obstacle, as a river or a range of hills or mountains. The names of these towns frequently betray their origin—Ox*ford*, Stam*ford*, Brent*ford*, Cam*bridge*, Ux*bridge*—while Leeds and Manchester are situated at the meeting of roads over the mountains. The advantage of having coal without having to pay for transport has given rise to many manufacturing towns on the coalfields: for example, the towns in the "Black Country," on the South Lancashire coalfield, and on the Potteries coalfield. The supply of water is another very important factor in determining the site of a town. This largely influenced the removal of Salisbury, referred to above. Sometimes the water supply is especially suitable for a particular industry, as for wool-washing and dyeing in the west of England, where some of the best cloth is still made, in spite of the absence of coal; for paper-making, as in West Kent; or for brewing, as at Burton and Dublin.

A good way of opening up a lesson on this subject is to suppose a given town to be invested by a besieging army. If shut off from the outer world, its inhabitants could not feed and clothe themselves. How, then, do they get money to pay for the food and clothes that come from outside?

English Literature.

For general reading take Scott's *Woodstock*. For special study we now come to Milton's *Paradise Lost* (Books I. and II.). Our general advice to the student who takes up a work is to read it through without help, and form his own opinion first-hand; but in the case of *Paradise Lost* the work is so difficult to appreciate properly on first reading, except by the trained student of literature, or one who can understand at once the numerous allusions, that it will be the safest course to see what other people think of the poem. The best books to read on the subject are Addison's papers, which were published in the *Spectator*, and which did much to secure a due recognition of Milton's works. The collection is published in a little volume by Messrs. Chambers. The student should also read Dr. Johnson's life of Milton in his *Lives of the Poets*, which deals with the subject in a very learned manner. Some of the criticisms are rather captious, but it deserves careful reading, as does also Macaulay's *Essay on Milton*. The chapter on *Paradise Lost* in Coleridge's *Literary Remains* is also well worth reading; and if any of our readers have access to Hallam's *History of European Literature*, they should read the part that treats of Milton's works. Those of our readers who have followed our advice and bought the Globe edition of Milton's works will find in Professor Masson's introduction an account of Milton's works which it will be very difficult to surpass.

Paradise Lost belongs to that class of poems known as epic poems, which includes in Greek the *Iliad* and *Odyssey* of Homer, in Latin the *Æneid* of Virgil, and in Italian *Jerusalem Delivered* by Tasso, and Dante's *Divina Commedia*, consisting of three parts—the *Inferno*, *Purgatorio*, and *Paradiso*. These may be described as the great epic poems of the world, and Milton's *Paradise Lost* does not suffer by being compared with any of them.

The characteristics of epic poetry are summed up by Arnold as follows: "The subject of the epic poem must be one great complex action. The principal personages must belong to the high classes of society, and must be grand and elevated in their ideas. The measure must be of a sonorous dignity befitting the subject. The action is developed by a mixture of dialogue, soliloquy, and narrative."

We need hardly say that the material for *Paradise Lost* is drawn chiefly from the Bible, with which the student must be well acquainted who would appreciate Milton. The tender and pure

soul of Milton has painted the happiness of our first parents in the most delicate colours and the most graceful lines that poetry has ever invented. The picture of this happiness is preserved from dullness, in the first place, by the vigour and grandeur of the first books descriptive of darkness, anger, and torment; then by the feeling of danger at Satan's approach, and the immense interest attaching to the happy pair, on whom depended the world's future and hopes; and finally by the fatal development and the deep pathos with which the poet surrounds it.

The chief characters of Milton's style are its sublimity, its force, which sets one thinking, rather than the clearness with which he finishes off his images. He suggests rather than describes, and makes one think out the picture from the few touches he gives. He carries the earnest reader away with him, and makes him think and feel that he is a poet himself.

Read carefully through the first two books of *Paradise Lost*, and make a running analysis of the plot. Try also to trace out the characteristics given above, or in the criticisms you read.

English History.

Take the reigns of James the First and Charles the First. It is advisable to take stock of the condition of the chief European countries at the beginning of the Stuart period. Spain, which had been such a mighty power under Charles, who was also emperor (Charles the Fifth), had spent itself in a futile endeavour to stamp out Protestantism, and sank into the rank of a secondary European power on the death of Philip the Second in 1598. But the failure of the Spanish Armada did not end the conflict between the Roman Catholics and Protestants. The last great conflict was the Thirty Years' War, really a series of wars (1618-48). England was not directly mixed up in this war, but it produced such great changes in the European states that its influence was widely felt. Our readers will find the best account of this in Gindely's *History of the Thirty Years' War*. An attempt had been made by the Peace of Augsburg to settle the religious troubles of Germany, but it had two weak points—(1) it recognised as Protestants only the Lutherans—the followers of Calvin and of Zwingli were not recognised; (2) it allowed Protestant princes to appropriate church property. Protestantism made great progress in Bavaria, and also in Bohemia, thanks to the foundation laid by Huss. In 1607 the Protestants of Donauwörth attacked a procession of monks. Thereupon Maximilian, Duke of Bavaria, captured the town, drove out the Lutheran clergy, and re-established the Catholic worship. This led the Protestant princes to form the Protestant Union, under the Elector Frederick. He was a Calvinist, and consequently the Elector of Saxony, who was Protestant, but Lutheran, refused to join it. The next year a Catholic League was formed under Maximilian of Bavaria. The sides were now organised for war, which soon broke out. By the marriage of Ferdinand the First, Bohemia had become united to the possessions of the House of Hapsburg, but the inhabitants were mostly Protestants. As their privileges were not respected, and two Protestant churches were destroyed at Prague, a revolution broke out, the rule of the Hapsburgs was renounced, and the crown offered to the Elector Frederick, who was the head of the Protestant Union, and son-in-law of James the First. Frederick received so little support either from within or without Bohemia that after a single battle (White Hill, 1620) he was put to flight by Maximilian, to whom the emperor awarded the greater part of the Palatinate—that is, Frederick's original dominions.

A new champion of the Protestant cause appeared in the person of Christian the Fourth, King of Denmark, who invaded North Germany in 1625. After some successes, he suffered two severe defeats by Wallenstein, the general of the Catholic League, and in 1629 agreed to withdraw from the struggle.

The emperor then issued the Edict of Restitution, in which he ordered all church property which had been seized since the Peace of Augsburg to be restored, and refused to allow any Protestants except Lutherans the free exercise of their religion. Wallenstein showed great cruelty in carrying out this edict, and the other League leaders, who were jealous of him, used this as a pretext to induce the emperor to dismiss him.

In 1630 a still more powerful champion appeared—namely, Gustavus Adolphus, King of Sweden. He hoped not only to aid the Protestants, but also to secure for himself territories along the south of the Baltic, thus completely converting that sea into a Swedish lake. At first he had little support, but after the destruction of Magdeburg by Tilly, the general of the League, the Protestants rallied round Gustavus Adolphus, who routed the army of the League. After wintering on the Rhine, Gustavus Adolphus defeated Tilly, who died in the battle, in Bavaria, and then captured Munich. He then marched on towards Vienna, and fought a desperate battle at Lützen in November 1632, in which he defeated Wallenstein, but was himself killed. Then the war degenerated into a series of raids and plundering excursions, and Wallenstein was murdered in 1634. The same year the imperial army gained the battle of Nördlingen, and obliged the Elector of Saxony to break off his alliance with the Swedes.

At this point the war might have ended, but Richelieu thought it would be to the interest of France to strike a blow at the emperor. He aimed at making the Pyrenees the boundary of France on the south, and the Rhine the boundary on the east. Hence we actually find the Catholic cardinal attacking the Catholic League, and forming alliances with the Protestant princes. The French generals, particularly Condé and Turenne, established the supremacy of French arms, and made a glorious opening for the reign of Louis the Fourteenth. Roussillon, Artois, Alsace, and Lorraine fell into the hands of the French. All parties were now anxious for peace, but the quarrel had become so very complicated that it took four years to work out a satisfactory conclusion to the negotiations. Peace was concluded by the Treaty of Westphalia, by which the religious toleration accorded to the Lutherans by the Peace of Augsburg was extended to the Calvinists; the Protestant princes were allowed to retain church lands held since 1624; and the German empire was practically dissolved by according to each state the right to determine its own religion, and to make treaties with one another and with foreign powers. France and Sweden each gained an extension of territory, and the independence of Switzerland and of the United Netherlands was acknowledged. The Elector of Brandenburg gained great power among the German states, and soon after became King of Prussia, and from that time the House of Hapsburg gradually lost in importance before the House of Hohenzollern.

Geography.

Finish the geography of the British Isles. There are many useful problems in geography which can be worked out on the lines indicated in our notes on School Method above.

The circumstances which have led to the foundation and development of individual towns should be carefully worked out. It should be noted that a hundred years ago there was only one town in England and Wales with over 100.000 inhabitants—London; while only five others—Manchester, Liverpool, Birmingham, Bristol, and Leeds—had more than 50,000.

The railways generally receive scanty treatment in the text-books, but the student can work out many interesting facts for himself. The course taken by a railway should be associated with the configuration of the land. It will be noted that as far as possible railways have been constructed along river valleys, so as to take advantage of the engineering work done by nature. As an example of this, we might trace the Great Western Railway route from London to Exeter. At first it takes a straight course from Paddington through Maidenhead (where it crosses the Thames) to Reading. This section, keeping to the valley of the Thames, meets with no hills, so that after leaving London no tunnels have had to be constructed. From Reading it proceeds along the valley of the Kennet, and as this valley is narrow, the railway and river run very close together, the railway gradually rising as it goes up the valley through Newbury and Hungerford. As it skirts the north side of Salisbury Plain the engineering is more complicated, and a very long tunnel—the Box Tunnel—has to be passed before the railway emerges into the valley of the Avon, passes Bradford and Bath, and reaches Bristol. It then avoids the Mendip Hills by running between them and the sea. It then enters the valley of the Tone, and passes Taunton, and next crosses the low watershed separating the valley of the Tone from that of the Exe, and reaches Exeter by following the Culm, a tributary of the Exe. An alternative route to Bristol follows the Thames after leaving Reading, and passes through Swindon. A new route has been recently opened through Shepton Mallet, to Exeter; but as the river valley has not been closely followed, the expense of making cuttings, embankments, and tunnels has been very considerable.

Other railway lines should be traced in the same manner; and with regard to the towns through which they pass, it should be noted whether the town was an important one when the railway was made, and the railway company endeavoured to secure the trade of the town, or whether the town has developed in consequence of the railway passing through it, or whether it was originally a considerable place, and has since increased.

Arithmetic.

The syllabus excludes "true discount;" and inasmuch as the discount on bills which have but a short time to run is never calculated according to the mathematical rule, there is not

much to be said for studying "true discount." But the problems in it afford a very useful mental training, and lead the student to see what present payment is the equivalent of a given payment in the future, so we strongly advise our students to go through the chapter. Compound interest should also be studied this month.

ALGEBRA.

Take the chapter on fractions. No new principles are involved beyond what the student has been in the habit of applying in arithmetic, but capital practice is given in factorising, and in dealing with the subject in a general way.

GEOMETRY.

Prepare proofs to Euclid, Book III., Props. 18–22 and 31. These are specially indicated in the syllabus, but for the sake of continuity and completeness the others in the book should also be read carefully through.

SCIENCE.

This month we will finish the section on gravity by investigating the meaning of the statement in the syllabus, "Water finds its own level." Take a pie-dish and fill it with water; then lay a tumbler on its side in the dish, and turn it over so that it stands mouth downwards in the dish. It will probably be seen that the water in the tumbler is not at the same level as the water in the dish. If it is, by raising the tumbler, but still keeping its mouth below the surface of the water in the dish, a difference of level is soon brought about. If an air pump is handy, the experiment may be repeated with a small dish and glass that can be placed under the bell glass of the air-pump. As we begin to pump the air out we reduce the pressure, and find that if there was a small amount of air in the upper part of the glass the water in the glass will gradually sink until it is at the same level as the water outside; then it will go lower still; and finally it will go right down to the rim of the glass, and then some of the air will bubble out. This experiment teaches us that water does not always find its own level, but that when the pressure of the air on the water outside is greater than that within, the water stands higher within the glass, and *vice versâ*. Careful measurements of the pressure of the air in the two cases, or in a series of such cases, show that the difference of pressure is equal to the pressure caused by a column of water whose height is the difference between the levels within and without the glass.

A more general way of stating the principles that result in water as a rule finding its own level, is that a fluid presses equally in all directions. The text-book gives experiments that illustrate this law. An immediate result of this property is that the pressure at all points in the same horizontal plane is the same. If this were not so, some of the particles would be pushed towards the parts where the pressure is least. If we attempted to pile up water at one end of a trough, we should be acting against this property; for we should cause a greater pressure in one part, and consequently some of the water would flow away to places where the pressure was less. In speaking of the pressure, we mean, of course, the total pressure; and this consists partly of the pressure of the atmosphere, which, as a rule, is uniform over the whole surface of the liquid. If this is the case, it may be neglected, and the water will find its own level. But if not, we have to take it into account, and consider the total pressure at any horizontal plane as made up of the pressure of the water above it, plus the pressure of the air in the several parts.

SIR ISAAC PITMAN AND SONS, LTD., have been appointed publishers of the souvenir of the N.U.T. Conference at Oxford next Easter.

MESSRS. RALPH, HOLLAND, AND CO. have almost ready for publication a series of three volumes of educational science by Dr. Hayward, the well-known exponent of Herbartianism. They will deal respectively with Herbart and his influence, general principles of education, and the primary curriculum.

AT the recent Milan Exhibition, the well-known house of Messrs. L. and C. Hardtmuth were awarded against all comers the Grand Prix, which is the highest possible award, both for their world-renowned pencils and also for the celebrated Waterman's ideal fountain pens.

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PHYSIOGRAPHY.

(STAGES 2 AND 3.)

ELASTICITY.

If we take a piece of rubber cord and pull the ends apart, the cord stretches. We can feel that the rubber resists the stretching force; and after it has become extended, if we remove the force, we find that the cord returns to its original length. If we bend a strip of steel spring, and then remove the bending force, we find that the steel returns to its original shape. These two examples give good illustrations of what we term elasticity, and will enable us easily to understand the following definition: the elasticity of a substance is the property by which the body when deformed—that is, stretched, bent, twisted, compressed, etc.—tends to return to its original condition.

In the case of a solid we may deal with the alteration in length due to the application of force, as in the case of the stretched rubber cord, and the elasticity we are dealing with in this case may be spoken of as the lineal elasticity, or simply the elasticity of the substance. We may, however, compress a piece of rubber so that its volume becomes decreased, and we are then dealing with what is called the volume elasticity, which is quite different from the simple elasticity. Again, we may twist a piece of rubber, and it tends to return to its original form. The elasticity dealt with here is called the torsional elasticity. In the case of a liquid or a gas, we necessarily deal only with the volume elasticity.

If we wish to compare the values of the elasticities of various bodies we must have some method of expressing them numerically, and the method of doing this we will now explain.

We will take as an example a rubber cord which is to be stretched. Let the original length be represented by L centimetres when there is just sufficient force applied to keep the cord straight. Now let the stretching force be increased by a force of P dynes. The cord will increase in length. Call this elongation l. The magnitude of the quantity l will obviously depend upon the original length, for each centimetre will extend by the same amount. It will also depend upon the magnitude of P, for the greater the stretching force the greater will be the increase in length and upon the area of cross section, for it will be easier to stretch a thin cord than a thick one, other things being equal. Lastly, it will depend upon the force with which the material resists the stretching force—that is, upon the elasticity of the material. It is found that, if the stretching is not carried beyond a certain limit depending on the material used, the elongation produced is proportional to the force applied. It is also found that the elongation is inversely proportional to the area of cross section of the cord. We can easily understand this, for if we double the area the resistance will be doubled and the elongation reduced to one-half.

Now let us calculate the force which would be required to double the length of a cord of the same material, but of one square centimetre in cross section. If we call this figure E, its value will be—

$$E = \frac{P}{a} \frac{L}{l},$$

where $\frac{P}{a}$ represents the force divided by the area of cross section, or the force per unit area of cross section, and $\frac{L}{l}$ represents the ratio of the elongation required to the elongation actually produced by the force P. The figure E is often spoken of as the *co-efficient of elasticity*. It is also often spoken of as *Young's modulus of elasticity*.

Now there are many substances which we cannot stretch to double their original length without permanently deforming them, or even breaking them. In fact, there is with each substance a limit beyond which we cannot go without either breaking it or permanently deforming it in such a way that it will not return to its original length when the stretching force is removed. This limit is spoken of as the limit of perfect elasticity. If we go beyond this limit, and the material does not break, we observe a new property, which is named ductility.

In the cases of most substances the limit of perfect elasticity is reached long before the material has doubled in length, and in such cases we must be content with a smaller elongation, and calculate by proportion what the force required would be, provided the material could be stretched to double its original length without any permanent deformation. The above is an explanation of what is meant by the co-efficient of elasticity. But there is another and better view of what the modulus of elasticity really represents. *The co-efficient of elasticity is generally defined as the* RATIO *of the applied* STRESS *to the* STRAIN *produced thereby.*

To thoroughly understand this definition we must have perfectly clear ideas of what the terms stress and strain really mean, and hence the following definitions of them will be useful: STRESS *is the force applied per unit area,* STRAIN *is the fractional deformation produced.* If we are using the units of the English system, then the stress will be expressed in *poundals* per square foot; that is to say, if the force is due to a mass of M pounds per square foot, the force will be $M \times g$ poundals per square foot, where g represents the force of attraction exerted by the earth on a mass of one pound. In London $g = 32{\cdot}2$ poundals. If we are using the units of the metric system, the stress will be expressed in *dynes* per square centimetre; that is to say, if the force is due to a mass of M grams per square centimetre, the force will be $M \times g$ dynes per square centimetre, where g represents the force of attraction exerted by the earth on a mass of one gram. In London $g = 981$ dynes approximately.

In the case of a cord or wire being stretched, the strain is the ratio of the increase in length to the original length. This ratio will be the same no matter what system of units we employ, so long as the increase in length and the original length are both expressed in terms of the same units. In the English system we should express them both in feet, and in the metric system both in centimetres.

It will easily be seen that the two definitions of the co-efficient of elasticity which we have used are equivalent; for apply the expression—

$$E = \frac{\text{stress}}{\text{strain}}$$

to the stretching of a cord or wire. The stress equals $\frac{P}{a}$, and the strain is $\frac{l}{L}$, and on dividing we get

$$E = \frac{P}{a} \div \frac{l}{L} = \frac{P}{a} \cdot \frac{L}{l},$$

which is the same expression as the one we had before.

In the case where we are considering volume elasticity, as when we compress a gas, the coefficient of elasticity is still the ratio of the stress to the strain, or

$$E = \frac{\text{stress}}{\text{strain}}.$$

In this case the stress will be the increase in pressure on the gas per unit area of surface—that is, poundals per square foot or dynes per square centimetre, according to the system of units used—and the strain will be the ratio of the decrease in volume to the original volume.

CHEMISTRY.

(ADVANCED AND HONOURS.)

BY C. A. WEST, B.SC., A.R.C.S., F.I.C.

Determination of Boiling-Points.—In our last article we saw how the melting-point of a substance could be determined. We will now see how the boiling-point of a substance may be found. In the case of a *pure liquid* the boiling-point is always the same if the pressure is the same; but it must be remembered that the boiling-point of the liquid is the temperature at which its vapour pressure is equal to the pressure to which the substance is subjected. Hence under atmospheric pressure, if the height of the barometer varies, the temperature of the boiling-point will also suffer slight variations, the variation amounting possibly to one or two degrees. In the case of the melting-point the variation with pressure is so exceedingly small that it may for most purposes be entirely neglected; but this is not true in the case of the boiling-point. However, in chemical laboratories it is not usual to try to make any correction to the observed boiling-point for variations of barometric pressure. Strictly speaking, however, we must remember that the normal boiling-point is the temperature at which the vapour pressure is equal to the pressure of a barometer column of normal height at 0° C.—that is, 76 cms. at 0° C.

If the liquid can be obtained in considerable quantity, it is usual to place some of it in an ordinary distilling flask. A thermometer is passed through a cork in the neck of the flask, as shown in Fig. 1, so that its bulb is a little distance above the

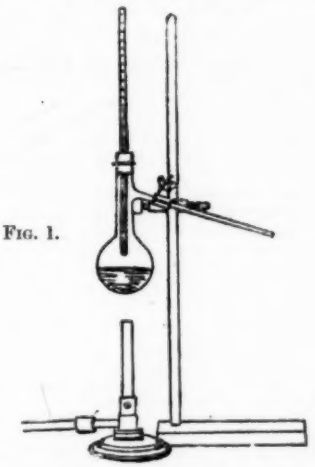


FIG. 1.

surface of the liquid. If the liquid is not a corrosive one or an inflammable one, the temperature is then raised by heating with a bunsen flame. When the liquid boils, its vapour passes up the neck of the flask and out by the delivery tube, thus raising the bulb and part of the stem of the thermometer to the boiling-point. If the liquid is an inflammable one, or dangerous in any way, the flask is heated up in a water bath, oil bath, or sand bath, so as to prevent the liquid taking fire or doing other damage if the flask happens to break. If the liquid is very volatile, a Liebig's or other condenser with a receiving flask should be attached to the delivery tube; but if the liquid is not a very volatile one, it will be sufficient to place a beaker to catch any liquid condensed in the delivery tube.

As soon as the height of the thermometer thread has become constant, the reading may be taken. If the whole of the thread is below the point at which the delivery tube leaves the neck of the flask, this may be taken as the boiling-point under the existing pressure. If, however, the whole of the thread is not heated up, a correction should be made to the thermometer reading exactly as described under melting-point determinations last month. If the quantity of liquid at our disposal is small, a different method must be employed.

A very ingenious method for such a case was devised some years ago by Mr. Chapman Jones of the Royal College of Science, South Kensington, and depends upon the fact previously mentioned, that the boiling-point is the temperature at which the vapour pressure of the liquid is equal to the pressure to which it is subjected. The method consists in observing when this vapour pressure reaches the required value, and then reading the temperature. It is carried out as follows:—A piece of thin walled glass tubing with a bore of about five millimetres is bent into a U-tube of the form shown in Figs. 2 and 3. The shorter of the two limbs is closed, and the other left open. A small quantity of the liquid is introduced into the tube, and the tube turned round so that the liquid remains in the short limb when the tube is inverted.

The end of the long limb is now dipped into a small beaker of mercury. The beaker and tube are then supported from a glass rod as shown in Fig. 2, and immersed in a bath of water

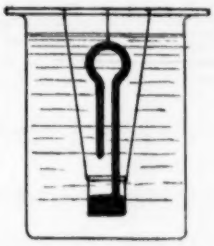


FIG. 2.

or oil. The temperature of the bath is then raised above the boiling-point of the liquid, so that the latter vaporises and drives the air from the U-tube. On being allowed to cool, the vapour remaining in the tube condenses, and the mercury enters, filling the tube except for the small space occupied by the condensed vapour.

The U-tube is now removed from the bath, and the condensed liquid caused to flow into the shorter limb. Some of the mercury is next removed by pushing a glass rod down the tube until the surface of the mercury in the longer limb is below the mercury surface in the short limb.

The U-tube is now placed in a bath, with the open end upwards, as shown in Fig. 3, and the temperature raised until the level of the mercury is the same in the two limbs. When this is so, we know that the vapour pressure is equal to the atmospheric pressure, and this is the boiling-point at that pressure.

A reading of the thermometer should be taken just as the two mercury surfaces come into line. The temperature will then rise too high, and the mercury surface in the long limb become higher than the other. The temperature should then be allowed to fall, and a second thermometer reading taken when the mercury surface in the long limb falls to the level of the other. The mean of the two readings may be taken as the boiling-point.

After having made a rough determination in this way, a second determination should be made, the temperature being altered very slowly as the boiling-point, as already found, is approached. This allows the thermometer and the U-tube time to become of practically the same temperature throughout. It will be obvious that the boiling-point may be determined by this apparatus at the standard pressure of 760 mm. of mercury, even when the atmospheric pressure differs from normal. Suppose, for instance, that the barometric pressure is 750 mm., all that would be necessary would be to read the temperature when the

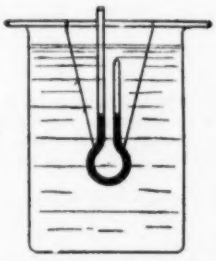


FIG. 3.

height of the mercury surface in the long limb of the U-tube was 10 mm. above the surface in the other limb, for then the vapour would be under a pressure of 760 mm. of mercury.

It may be objected that the temperature of the short column of mercury is high and its density low, but on such a short length the difference would have practically no effect.

However, it is easy to correct this, as the density of the mercury is known from Regnault's tables when the temperature is known. In these determinations it is, of course, necessary to correct for the projecting thread of the thermometer.

MATHEMATICS.

(STAGES 2 AND 3.)

BY FRANK CASTLE, M.I.M.E.,

Royal College of Science; Lecturer on Mathematics, etc., Morley College; Author of "Elementary Practical Physics," "Practical Mathematics," etc.

Ratio and Variation.—There is probably no section of algebra of more importance than that dealing with ratio and variation. As it is also of great utility in trigonometry, etc., it will be obvious that the time spent in becoming familiar with the methods adopted will be of the greatest use so far as future progress is concerned.

One of the simplest and also one of the most important theorems is concerned with the ratio of two quantities, which may be denoted by a and b.

$$\text{Thus, if } \frac{a}{b} = \frac{c}{d}, \text{ then } \frac{a+b}{a-b} = \frac{c+d}{c-d}.$$

This may be proved as follows :—

If $\frac{a}{b} = \frac{c}{d}$, then adding unity to each side of the equation, we obtain $\frac{a}{b} + 1 = \frac{c}{d} + 1$, or $\frac{a+b}{b} = \frac{c+d}{d}$.

By inverting the two sides and subtracting unity from each side the required theorem is obtained.

Variation.—The symbol $\propto$ is used to denote variation. Thus a varies as b may be conveniently written as $a \propto b$, or $a = mb$ where m is a constant, the magnitude of which can be determined when simultaneous values of a and b are known. The methods adopted both in ratio and in variation are best seen by their application to a few typical examples.

Ex. 1. There are two coins, such that 15 of the first and 14 of the second have the same value as 35 of the first and 6 of the second. What is the ratio of the value of the first coin to that of the second?

Let x denote the value of the first coin, and y denote the value of the second coin, both expressed in the same units.

Then the given conditions lead to the equations

$$15x + 14y = 35x + 6y,$$
$$\text{or } 14y - 6y = 35x - 15x.$$
$$\therefore 8y = 20x;$$
$$\therefore \frac{x}{y} = \frac{2}{5}.$$

Hence the ratio of the values is 2 : 5.

Ex. 2. It is known that the volume of a cylinder varies as the base and height jointly. If the volume of the first of two cylinders is to that of the second as 11 : 8, and the height of the first is to that of the second as 3 : 4, and if the base of the first has an area of 16·5 square feet, what is the area of the base of the second?

Let V, A, and h denote the volume, the area of the base, and the height respectively of the first cylinder, and V^1, A^1, h^1 the corresponding data for the second cylinder, then by the conditions of the question

$$\frac{V}{V^1} = \frac{A \times h}{A^1 \times h^1}; \text{ also } \frac{h}{h^1} = \frac{3}{4}. \quad \therefore h = \frac{3h^1}{4}.$$

Hence substituting $\frac{11}{8} = \frac{16{\cdot}5 \times 3h^1}{4A^1 \times h^1}$.

$$\therefore A^1 = \frac{8 \times 16{\cdot}5 \times 3}{4 \times 11} = 9.$$

Hence area of base of second cylinder is 9 square feet.

Ex. 3. It is known that z varies as the sum of two quantities, x and y, and that y varies as x^2. It is also known that when x is equal to 3, y is equal to 12, and z is equal to $4\frac{1}{2}$. Find z in terms of x. (1902.)

$z \propto (x + y)$, or $z = m(x + y)$, where m is a constant;

also $y \propto x^2$. $\therefore y = nx^2$, where n is a constant.

Substituting this value

$$z = m(x + nx^2) = mx + mnx^2. \quad \ldots \quad \text{(i)}$$

When $x = 3$, $y = 12$;

$$\therefore 12 = n \times 9,$$
$$\text{or } n = \frac{12}{9} = \frac{4}{3}.$$

Also as $z = 4\frac{1}{2} = \frac{9}{2}$, we obtain the relation

$$\frac{9}{2} = m(3 + 12);$$
$$\therefore m = \frac{9}{2 \times 15} = \frac{3}{10}.$$

Substituting this value for m in (i)

$$\therefore z = \frac{3}{10}x + \frac{3}{10} \times \frac{4}{3}x^2$$
$$= \frac{3}{10}x + \frac{2}{5}x^2.$$

Ex. 4. The square of the time of a planet's revolution round the sun varies as the cube of its distance from the sun. The distances of the earth and Mercury from the sun are as 91 to 35. Find in days the time of Mercury's revolution, assuming the time of the earth's revolution to be 365 days. (1905.)

Let t denote the time of a planet's revolution round the sun, and d its distance from the sun.

Then $t^2 \propto d^3$.

$\therefore t^2 = md^3$, where m is a constant.

If t_1 is the time of the earth's revolution, and t_2 the time of Mercury's revolution, d_1 and d_2 the corresponding distances from the sun, then

$$t_1^2 = md_1^3,$$
$$t_2^2 = md_2^3.$$
$$\therefore \left(\frac{t_2^3}{t_1^3}\right) = \left(\frac{d_2}{d_1}\right)^3,$$
$$\text{or } \frac{t_2}{t_1} = \left(\frac{d_2}{d_1}\right)^{\frac{3}{2}},$$
$$\text{as } \frac{d_2}{d_1} = \frac{35}{91} \text{ and } t_1 = 365.$$
$$\therefore t_2 = \left(\frac{35}{91}\right)^{\frac{3}{2}} \times 365$$
$$= 87{\cdot}063.$$

Ex. 5. Give a geometrical instance (1) of a quantity (y) that varies directly as another quantity (x); (2) of a quantity (y) that varies inversely as another quantity (x).

A quantity y consists of the sum of two parts, of which one varies directly as x and the other inversely as x. It is known that when $x = 1$, $y = 3$, and that when $x = \frac{1}{2}$, $y = 4$. Show that $x(3y - 4x) = 5$. (1901.)

Ex. 6. (1.) It is known that x varies directly as y and inversely as z. It is also known that x equals a when y equals b and z equals c. Find an equation connecting x, y, z and a, b, c.

(2.) A certain quantity y equals the sum of two quantities, one of which varies directly as x, and the other inversely as x. Given that $y = 2$ when $x = -1$, and that $y = 4$ when $x = 2$, find y in terms of x. (1902.)

Ex. 7. (1.) If $x + y : x - y :: 2 : 3$, find the ratio of

$$x^2 + xy + y^2 : x^2 - xy + y^2.$$

(2.) On a straight line four points A, B, C, D are taken in order, such that AB = BD and AC : CD = CD : BC. Find the ratio of CD : AD. (1903.)

Ex. 8. The time taken by a body to slide down an inclined plane varies directly as the length of the plane, and inversely as the square root of the vertical height. The time is one second when the plane is 12 feet long and 9 feet high. Find the time taken when the plane is 15 feet long and 6 feet high.

$$\text{Ans. } \frac{3\sqrt{6}}{8}. \quad \text{(1905.)}$$

Ex. 9. When are quantities said to be in continued proportion?

If five quantities a, b, c, d, e are in continued proportion, show that the ratio of the first to the last is the fourth power of the ratio of any two consecutive quantities.

Show also that c is a mean proportional between a and e, and that

$$ab + bc + cd + de$$

is a mean proportional between

$$a^2 + b^2 + c^2 + d^2 \text{ and } b^2 + c^2 + d^2 + e^2. \quad \text{(1906.)}$$

Ex. 10. (1.) If $a^2 - ab + b^2 : c^2 - cd + d^2 :: ab : cd$, show that either $a : b :: c : d$ or $a : b :: d : c$.

(2.) A quantity x equals the sum of two quantities; one of which varies as t and the other as t^2. When t equals 3, x equals 159, and when t equals 5, x equals 425. Find the value of x when t equals 10. (1899.)

Ans. 1650.

Ex. 11. State what is meant when one quantity is said to vary as another quantity, and give an example.

It is known that x varies directly as y and inversely as z. It is also known that x is 11 when y is 300 and z is 30. Find the value of y when x changes to 12 and z to 29·7. (1899.)

Ans. 324.

OUR QUERY COLUMN.

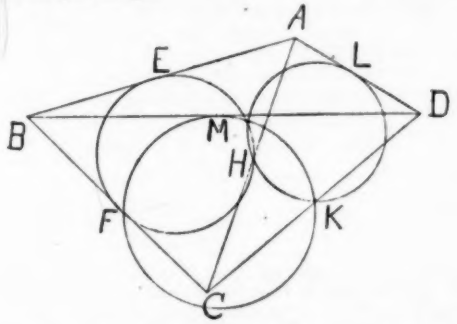
RULES.

1. Each correspondent is restricted to *one* question.
2. Each query must be accompanied by the name and address of the correspondent, and the *coupon* which appears on the back wrapper of the current number of the Journal.
3. CORRESPONDENTS MUST IN ALL CASES STATE THE SOURCE FROM WHICH THEIR QUERY HAS BEEN OBTAINED.

The editor reserves to himself the right to decline to answer any question which is, in his judgment, unsuited to the Magazine.

Bike.—O is the orthocentre of the triangle ABC, and D is any other point. Show that in general a rectangular hyperbola can be drawn through the five points A, B, C, D, O, and give a geometrical construction for the centre.

In any standard treatise on Conics it is proved—(i) that one conic, and only one, can be described through five given points (if three of the given points are collinear, the conic degenerates into a pair of straight lines); (ii) that if a rectangular hyperbola passes through the angular points of a triangle, it will also pass through the orthocentre, and conversely every conic which passes through the angular points and the orthocentre of a triangle must be a rectangular hyperbola; (iii) that the locus of the centres of rectangular hyperbolas which circumscribe a triangle is the nine-point circle of the triangle.



From (i) and (ii) it is obvious that in general a rectangular hyperbola can be drawn through the five points A, B, C, D, O, and that only one rectangular hyperbola can be drawn through these five points. From (iii) it follows that the centre of the hyperbola will lie on each of the nine-point circles of the four triangles ABC, BCD, CDA, DAB. Hence these four circles will all pass through one point—namely, the centre of the hyperbola. Therefore, if we take E F H, H K L, K M F, the middle points of the sides of the triangles ABC, CDA, BCD, and describe the circles EFH, HKL, KMF, these circles will all pass through the same point, which is the centre of the rectangular hyperbola drawn through the five points A, B, C, D, O.

Sinew.—Prove—

$$\frac{1-\cos A-\cos(A+C)+\cos C}{1-\cos C-\cos(A+C)+\cos A}=\tan\frac{A}{2}\cot\frac{C}{2}.$$

$$\frac{1-\cos A-\cos(A+C)+\cos C}{1-\cos C-\cos(A+C)+\cos A}$$

$$=\frac{1-\cos(A+C)-(\cos A-\cos C)}{1-\cos(A+C)+(\cos A-\cos C)}$$

$$=\frac{2\sin^2\frac{A+C}{2}+2\sin\frac{A+C}{2}\sin\frac{A-C}{2}}{2\sin^2\frac{A+C}{2}-2\sin\frac{A+C}{2}\sin\frac{A-C}{2}}$$

$$=\frac{\sin\frac{A+C}{2}+\sin\frac{A-C}{2}}{\sin\frac{A+C}{2}-\sin\frac{A-C}{2}}$$

$$=\frac{2\sin\frac{A}{2}\cos\frac{C}{2}}{2\cos\frac{A}{2}\sin\frac{C}{2}}$$

$$=\tan\frac{A}{2}\cdot\cot\frac{C}{2}.$$

Puzzled One.—P is a point inside a triangle ABC at distances x, y, z from the vertices A, B, C respectively. If α, β, γ be the angles subtended at P by the sides a, b, c, show that

$$\frac{ax}{\sin(\alpha-A)}=\frac{by}{\sin(\beta-B)}=\frac{cz}{\sin(\gamma-C)}$$

$$=\frac{abc}{x\sin\alpha+y\sin\beta+z\sin\gamma}.$$

$$a^2=y^2+z^2-2yz\cos\alpha. \quad\ldots\ldots\quad (1)$$

$$b^2=z^2+x^2-2zx\cos\beta. \quad\ldots\ldots\quad (2)$$

$$c^2=x^2+y^2-2xy\cos\gamma. \quad\ldots\ldots\quad (3)$$

$$bc\sin A=yz\sin\alpha+zx\sin\beta+xy\sin\gamma. \quad\ldots\quad (4)$$

Taking (1) from the sum of (2) and (3), we have

$$b^2+c^2-a^2=2(x^2-zx\cos\beta-xy\cos\gamma+yz\cos\alpha).$$

But $b^2+c^2-a^2=2bc\cos A$;

$$\therefore bc\cos A=x^2-zx\cos\beta-xy\cos\gamma+yz\cos\alpha. \quad (5)$$

From (4), we have

$$yz=\frac{bc\sin A-zx\sin\beta-xy\sin\gamma}{\sin\alpha}.$$

Writing in (5) this value for yz, we have

$$bc\cos A=x^2-zx\cos\beta-xy\cos\gamma$$

$$+\frac{bc\sin A-zx\sin\beta-xy\sin\gamma}{\sin\alpha}\cos\alpha;$$

$$\therefore bc(\cos A\sin\alpha-\sin A\cos\alpha)=x^2\sin\alpha-zx(\cos\beta\sin\alpha+\sin\beta\cos\alpha)-xy(\cos\gamma\sin\alpha+\sin\gamma\cos\alpha);$$

$$\therefore bc\sin(\alpha-A)=x^2\sin\alpha-zx\sin(\alpha+\beta)-xy\sin(\gamma+\alpha).$$

But $\alpha+\beta+\gamma=2\pi$.

$$\therefore bc\sin(\alpha-A)=x^2\sin\alpha+zx\sin\gamma+xy\sin\beta;$$

$$\therefore abc\sin(\alpha-A)=ax(x\sin\alpha+y\sin\beta+z\sin\gamma);$$

$$\therefore \frac{ax}{\sin(\alpha-A)}=\frac{abc}{x\sin\alpha+y\sin\beta+z\sin\gamma}.$$

Similarly, it may be shown that

$$\frac{by}{\sin(\beta-B)}=\frac{abc}{x\sin\alpha+y\sin\beta+z\sin\gamma},$$

and $$\frac{cz}{\sin(\gamma - C)} = \frac{abc}{x\sin\alpha + y\sin\beta + z\sin\gamma}.$$

Hence $$\frac{ax}{\sin(\alpha - A)} = \frac{by}{\sin(\beta - B)} = \frac{cz}{\sin(\gamma - C)} = \frac{abc}{x\sin\alpha + y\sin\beta + z\sin\gamma}.$$

Grimsby.—Find the length of an arc which subtends one minute at the centre of the earth, supposed to be a sphere of diameter 7,920 miles.

We have $\frac{\text{arc}}{\text{radius}}$ = angle in radians.

Now an angle of one minute contains $\frac{\pi}{180 \times 60}$ radians.

Hence $$\frac{\text{arc}}{3960} = \frac{\pi}{180 \times 60};$$

$$\therefore \text{arc} = \frac{3960\pi}{180 \times 60};$$

$$\therefore \text{arc} = \frac{11\pi}{30} \text{ miles.}$$

Taking $\pi = 3{\cdot}14159$, we have

$$\text{arc} = \frac{11 \times 3{\cdot}14159}{30} = 1{\cdot}1519163 \text{ miles.}$$

Erin.—Find the real roots of the equations—

$$\left.\begin{aligned} x^2 + v^2 + w^2 &= a^2. \quad \ldots\ldots (1)\\ y^2 + w^2 + u^2 &= b^2. \quad \ldots\ldots (2)\\ z^2 + u^2 + v^2 &= c^2. \quad \ldots\ldots (3)\\ vw + u(y+z) &= bc. \quad \ldots\ldots (4)\\ wu + v(z+x) &= ca. \quad \ldots\ldots (5)\\ uv + w(x+y) &= ab. \quad \ldots\ldots (6) \end{aligned}\right\}$$

(Mathematical Tripos.)

From (1), (2), and (6), we have—

$$(x^2 + v^2 + w^2)(y^2 + w^2 + u^2) = a^2b^2$$
$$= (uv + wx + wy)^2;$$
$$\therefore x^2y^2 + v^2y^2 + w^2y^2 + w^2x^2 + w^2v^2 + w^4 + u^2x^2 + u^2v^2 + w^2u^2 = u^2v^2 + u^2x^2 + v^2y^2 + 2(uvwx + uvwy + w^2xy).$$

Hence we have—

$$(w^2 - xy)^2 + (wu - vy)^2 + (wv - ux)^2 = 0. \quad \ldots (7)$$

Since the roots are real, it follows from (7) that we must have—

$$(w^2 - xy) = 0;\ (wu - vy) = 0;\ wv - ux = 0;$$
$$\therefore w^2 = xy;\ wu = vy;\ vw = ux.$$

Similarly, from (2), (3), and (4), we may show that—

$$u^2 = yz;\ wu = vy;\ uv = wz.$$

And from (3), (1), and (5), we may show that—

$$v^2 = zx;\ vw = ux;\ uv = wz.$$

Hence we have

$$u^2 = yz,\ v^2 = zx,\ w^2 = xy,$$
$$vw = ux,\ wu = vy,\ uv = wz.$$

Substituting these values in the given equations, we have

$$x^2 + zx + xy = a^2.$$
$$\therefore x(x + y + z) = a^2.$$

Similarly,

$$y(x + y + z) = b^2,$$
$$z(x + y + z) = c^2,$$
$$u(x + y + z) = bc,$$
$$v(x + y + z) = ca,$$
$$w(x + y + z) = ab.$$

Hence $(x + y + z)^2 = a^2 + b^2 + c^2$.

$$\therefore x + y + z = \pm\sqrt{a^2 + b^2 + c^2}.$$

Therefore $$x = \pm\frac{a^2}{\sqrt{a^2 + b^2 + c^2}},$$

$$y = \pm\frac{b^2}{\sqrt{a^2 + b^2 + c^2}},$$

$$z = \pm\frac{c^2}{\sqrt{a^2 + b^2 + c^2}},$$

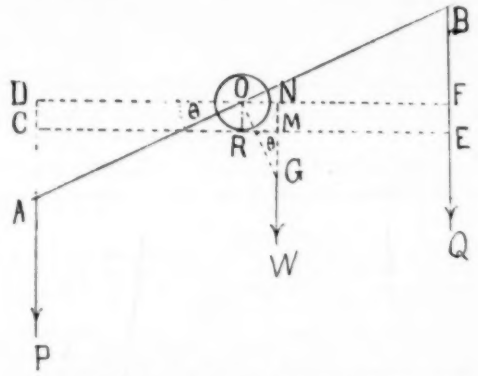
$$u = \pm\frac{bc}{\sqrt{a^2 + b^2 + c^2}},$$

$$v = \pm\frac{ca}{\sqrt{a^2 + b^2 + c^2}},$$

$$w = \pm\frac{ab}{\sqrt{a^2 + b^2 + c^2}}.$$

Puzzled.—The middle knife-edge of a symmetrical balance beam is replaced by a cylindrical pin whose axis is parallel to and in the same plane with the outer knife-edges; and the pin rolls on horizontal plates. Having given the distance $2a$ between the outer knife-edges, the weight W of the beam, and the depth k of its centre of gravity below the axis of the pin, find the inclination of the beam to the horizontal when given weights P, Q are suspended from the outer knife-edges.

(Inter. Science, 1906.)



Let A, B denote the outer knife-edges, O the axis of the cylindrical pin, and G the centre of gravity of the beam. Let R denote the contact of the pin with horizontal plates. Draw the verticals PA, WG, QB, and let horizontal lines drawn through R, O meet these verticals in CD, MN, and EF.

Of P, Q let P be the greater, and let θ be the angle of inclination of the beam to the horizontal.

Taking moments about R, we have

$$P \times CR = W \times MR + Q \times ER.$$

But $CR = DO = AO\cos\theta = a\cdot\cos\theta$,

$MR = NO = OG\sin\theta = k\sin\theta$,

and $ER = FO = OB\cos\theta = a\cos\theta$.

$$\therefore P\cdot a\cos\theta = W\cdot k\sin\theta + Q\cdot a\cos\theta.$$

Hence $$W\cdot k\sin\theta = a(P - Q)\cos\theta.$$

$$\therefore \tan\theta = \frac{a}{k}\cdot\frac{P - Q}{W},$$

$$\text{or } \theta = \tan^{-1}\frac{a(P - Q)}{kW}.$$

Persevere.—Ash saplings after 5 years' growth are worth 1s. 3d., and increase in value 1s. 3d. each year afterwards. For their growth they require twice as many square yards as the number of years they are intended to grow before cutting. A plantation is arranged so that each year the same number may be ready for cutting. Find the greatest annual income which can be obtained per acre, allowing 20 per cent. for expenses.

(Pendlebury's *Arithmetic.*)

If the plants were cut every five years, the number obtained per acre would be $\frac{4840}{2 \times 5}$. These would be worth $\frac{4840}{2 \times 5} \times 15$ pence. Hence the *annual* income obtained per acre would be $\frac{4840}{5 \times 2 \times 5} \times 15$ pence.

Thus, cutting every 5 years, the gross annual income would be $2420 \times \frac{15}{5^2}$ pence.

Cutting every 6 years, the gross annual income would be $2420 \times \frac{2 \times 15}{6^2}$ pence.

Cutting every 7 years, the gross annual income would be $2420 \times \frac{3 \times 15}{7^2}$ pence.

Cutting every 8 years, the gross annual income would be $2420 \times \frac{4 \times 15}{8^2}$ pence.

Cutting every 9 years, the gross annual income would be $2420 \times \frac{5 \times 15}{9^2}$ pence.

Comparing these incomes, it is obvious that they are as

$$\frac{15}{5^2} : \frac{2 \times 15}{6^2} : \frac{3 \times 15}{7^2} : \frac{4 \times 15}{8^2} : \frac{5 \times 15}{9^2};$$

that is, as

$$0{\cdot}6 : 0{\cdot}8\dot{3} : 0{\cdot}918\ldots : 0{\cdot}9375 : 0{\cdot}9\dot{2}\dot{5}.$$

Thus the income continually increases up to the 8 years' period, and on taking longer periods than 8 years the income may be shown to continually decrease.

The greatest income is therefore obtained by cutting every 8 years. The gross annual income per acre will then be $2420 \times \frac{4 \times 15}{8 \times 8}$ pence. Deducting 20 per cent. (or one-fifth) of this, we have the net income—namely,

$$\frac{4}{5} \times \frac{2420}{8 \times 8} \times 4 \times 15 \text{ pence, or £7, 11s. 3d.}$$

B.Sc., Wales.—See Everett's *Vibratory Motion and Sound*, chapter v.

Student.—Kindly give source of question. See Rule.

Maths.—If the two expressions

$$ax^3 - bx^2 + c,$$

and $bx^3 - cx + a$,

have a common quadratic factor, show that it is of the form

$$x^2 \pm x\sqrt{2} + 1.$$

(Pure Mathematics, Honours, 1906.)

Let $x^3 - \frac{b}{a}x^2 + \frac{c}{a} \equiv (x^2 + Ax + B)(x + d)$,

and $x^3 - \frac{c}{b}x + \frac{a}{b} \equiv (x^2 + Ax + B)(x + e)$.

Then $x^3 - \frac{b}{a}x^2 + \frac{c}{a} \equiv x^3 + (A + d)x^2 + (B + Ad)x + Bd$ . . (1)

and $x^3 - \frac{c}{b}x + \frac{a}{b} \equiv x^3 + (A + e)x^2 + (B + Ae)x + Be$. . . (2)

Comparing coefficients of like powers of x in (1) and in (2), we have

$$A + d = -\frac{b}{a} \quad . . . . . (3)$$

$$B + Ad = 0 \quad . . . . . (4)$$

$$Bd = \frac{c}{a} \quad . . . . . (5)$$

$$A + e = 0 \quad . . . . . (6)$$

$$B + Ae = -\frac{c}{b} \quad . . . . . (7)$$

$$Be = \frac{a}{b} \quad . . . . . (8)$$

Eliminating e between (6) and (8), we have

$$AB = -\frac{a}{b} \quad . . . . . (9)$$

Again eliminating e between (6) and (7), we have

$$B - A^2 = -\frac{c}{b} \quad . . . . . (10)$$

Eliminating d between (4) and (5), we have

$$\frac{B^2}{A} = -\frac{c}{a} \quad . . . . . (11)$$

Again eliminating d between (3) and (4), we have

$$A - \frac{B}{A} = -\frac{b}{a} \quad . . . . . (12)$$

Multiplying together (9) and (12), we have

$$A^2B - B^2 = 1 \quad . . . . . (13)$$

$$\therefore A^2 = \frac{1 + B^2}{B} \quad . . . . . (14)$$

Dividing (10) by (11), we have

$$\frac{A(B - A^2)}{B^2} = \frac{a}{b} \quad . . . . . (15)$$

But we have shown that $\frac{a}{b} = -AB$.

$$\therefore \frac{A(B - A^2)}{B^2} = -AB.$$

Hence $A^2 = B + B^2$ . . . . . (16)

From (14) and (16) we have

$$B + B^2 = \frac{1 + B^2}{B};$$

$$\therefore B^2(1 + B^2) = (1 + B^2).$$

Rejecting the solution $(1 + B^2) = 0$ as giving imaginary values of B, we have $B^2 = 1$;

$$\therefore B = \pm 1.$$

But $B = -1$ makes A^2 negative in (14). This would lead to imaginary values of A, which are inadmissible.

Hence $B = 1$.

From (14), $A^2 = 2$;

$$\therefore A = \pm\sqrt{2}.$$

Hence $x^2 + Ax + B$, the common quadratic factor of the two given expressions, is of the form

$$x^2 \pm x\sqrt{2} + 1.$$

CALIFORNIA AND THE JAPANESE.

A SCHOOL QUESTION.

A SECTION of President Roosevelt's recent Message to Congress deals with the Japanese question—a manifestation of racial feeling which is at present agitating the great republic. As every newspaper reader knows, the anti-Japanese agitation on the Pacific coast came to a head a short time ago in the refusal of the San Francisco School Board to permit Japanese children to attend the same schools with white children. For a year back the Japs have been landing in the Pacific States at the rate of from one to two thousand every week. Their coming has been resented. Agitation has been maintained for months past, and there is no denying the bitter feeling which rages at present. The American regards the Jap as a coloured person, and means to treat him as he does the negro. Further, he fears him as a commercial rival in the Far East and a labour competitor at home; hence his animosity. The President lays down unflinchingly and emphatically the general principles which should govern the treatment of the alien: "Not only must we treat all nations fairly, but we must treat with justice and goodwill all immigrants who come here under the law..... It is the sure mark of a low civilization, a low morality, to abuse or discriminate against, or in any way humiliate, such stranger who has come here lawfully, and who is conducting himself properly." The hostility shown towards the Japanese, he tells us, is "discreditable, and may be fraught with the gravest consequences to the nation.....To shut them out from the public schools is a wicked absurdity when there are no first-class colleges in the land which do not gladly welcome Japanese students, and on which Japanese students do not reflect credit." Mr. Roosevelt declares that in enforcing the rights of aliens under treaties he will employ, if need be, all the forces, military and civil, of the United States which he may lawfully employ. "It is unthinkable," he concludes, "that we should continue a policy under which a given locality may be allowed to commit a crime against a friendly nation, and the United States Government limited, not to preventing the commission of the crime, but, in the last resort, to defending the people who have committed it against the consequences of their own wrongdoing." Nervous publicists have imagined, as the result of the firm action promised by the President, a constitutional struggle culminating in civil war.

ENCYCLOPÆDIAS OLD AND NEW (ESPECIALLY NEW).

EDINBURGH has ever been the breeding-ground and nursery of Encyclopædias. It is remarkable that not only the historic *Britannica*, the famous *Chambers's*, and others less well known, but even the latest comer, THE HARMSWORTH, all first saw the light under the shadow of St. Giles's, or, in the last case, rather the shadow of Arthur's Seat; for it is to the spirit and initiative of the famous house of Nelson that the newest Encyclopædia owes its inception and compilation.

One of the most remarkable events in the history of recent publishing enterprise was the unexampled success achieved by the Encyclopædia compiled and printed by Messrs. Nelson, and published by arrangement with the *Daily Mail*, under the title of THE HARMSWORTH ENCYCLOPÆDIA.

The equivalent of three hundred thousand complete sets was sold in the serial issue, a figure never even approached before by any Encyclopædia.

This success was in no way due to "ingenious methods of advertising," but was the direct result of the intrinsic excellence of the work itself, and of the thoroughly popular and reasonable price at which it was issued. This was made possible by the courage and far-sightedness of the publishers, who determined to print the work in an edition of enormous magnitude, thereby lowering the manufacturing cost, and spreading the necessarily tremendous initial expense over a larger quantity.

The public were given to the full the benefit of this lessened cost, and responded in a way that exceeded even the most sanguine expectations of the publishers. Cheapness, and cheapness alone, would never have accounted for or procured this success. The public realized that they were purchasing a first-rate Encyclopædia, better in many respects than existing works of the same kind; not so cumbersome, incomparably better illustrated, and, above all, thoroughly new and modern. The work deals freshly and adequately with modern problems and modern ideas; it reflects faithfully the spirit of the day—its greater enlightenment, wider outlook, and lessened prejudices. The attention given to subjects on which knowledge has advanced or opinion altered in recent times, the open-mindedness, freshness of spirit, and the breadth of view of the articles, are remarkable.

A glance at the list of the principal contributors will strengthen the conviction that this is a thoroughly twentieth-century production, and will be a guarantee of the authoritativeness of the articles.

The serial issue was recently completed, and in issuing the work in complete volumes the publishers decided to reprint the whole of it, embodying every notable event since the completion of the issue in serial form, thus bringing the information up to date. The illustrations are so remarkable and valuable a feature, never having been approached in variety, number, beauty, or adequacy in any former Encyclopædia, that to do full justice to them and to the text it was thought well to use a heavier and thicker quality of paper, thereby extending the work to ten volumes. An important series of eighty superb coloured plates has also been added.

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THE EDITOR'S TABLE

E. J. ARNOLD AND SON, LEEDS.

The "A. L." Leaves. A useful collection of twelve leaves, nicely preserved and pressed between sheets of transparent celluloid. They will be found very useful in the nature-study and drawing lessons.

EDWARD ARNOLD, MADDOX STREET, LONDON, W.

A Song Garden for Children. By Norman O'Neill. The German songs illustrate the fact that Germans certainly understand the baby mind. The verses are simple, pretty, and instructive, and every one of the twenty-six songs is suitable for the infant school. The French songs (seventeen) are quite unlike these. They are neither suitable nor simple, and the music is not attractive.

Arnold's French Texts. General Editor, M. A. Gerothwohl, B.Litt., L.-ès-L. The following issues in this series are before us:—Vie de Polichinelle et Ses Nombreuses Aventures, par Octave Feuillet; Monsieur Tringle, par Champfleury; La Souris Blanche et Les Petits Souliers, par Hegesippe Moreau; Histoire de la Mère Michel et de Son Chat, par le Comte Emile de la Bédollière; Le Forçat, ou À tout péché miséricorde, Proverbe en deux Actes, par la Comtesse de Ségur; Aventures de Tom Pouce, par P. J. Stahl; Aventures du Chevalier de Grammont, par le Chevalier d'Hamilton; Histoire d'un Pointer Écossais, par Alexandre Dumas, Père; Marie Antoinette, par Edmond et Jules de Goncourt; Trafalgar, par Joseph Méry; and Le Bon Père, Comédie en un Acte et en Prose, par Florian. Carefully selected, varied in style, clearly printed, and fully equipped with introduction, explanatory notes, and vocabulary, these little books form a mine of excellent reading for French classes.

GEORGE BELL AND SONS, PORTUGAL STREET, LONDON, W.C.

Examples in Arithmetic, with some Notes on Method. By C. O. Tuckey, M.A., Assistant Master at Charterhouse, late Scholar of Trinity College, Cambridge. This excellent book follows the reform in mathematical teaching which has ceased to treat arithmetic, algebra, and geometry as separate subjects. The author does not hesitate to use algebraic symbols where their introduction will help his purpose; and the questions, besides involving theorems in geometry, mensuration, and Trigonometry, afford practice in physical calculations. There is also a very good section on logarithms and their application to the solution of problems in compound interest, etc. Mr. Tuckey's book will be a welcome addition to upper-form textbooks, and teachers generally will find in it a great deal which is useful and suggestive.

A First Algebra, with Answers. By Baker and Bourne. This book, which treats of the subject up to and including quadratic equations, is adapted from the first part of the larger book of the same authors. The explanations are very clear and scientific, and there are abundant and suitable exercises. The use of squared papers and the application of graphs to the idea of positive and negative quantities, to statistics, and to the solution of equations of the first degree, are very well treated. A very useful feature of the book is the large number of oral questions introduced for the purpose of familiarising the pupil with symbolic expression. The authors claim that they have put simple equations and easy problems in an early place. That is so as compared with the arrangement in many books, but why not introduce symbolic expression immediately after the treatment of negative quantities, and follow it up directly by simple equations of an integral character and easy problems following from them? The ground for the method of solution of simple equations of one unknown quantity has been already laid in the chapter on negative quantities. Problematic equations represent, to most boys, the first green spot at which they arrive in their journey over what is too often the arid desert of algebra, and as a teacher of the subject ourselves, we can testify to the increased interest they take in it when equations are treated before the four rules. We should also like to suggest to the authors whether it is not better in dealing with factors to take such an expression as $a^2 - b^2$ as a particular case of the general law that when two binomial factors are multiplied the co-efficient of the second term is the algebraic sum of the second terms of the factors, and the third term is their product. By taking $a^2 - b^2$ as a trinomial from which the valueless $O\ ab$ has been dropped, the pupil sees how the general law governing the product of two binomial factors applies here also. These criticisms apart, the book is one from which beginners are sure to derive very great profit.

ADAM AND CHARLES BLACK, SOHO SQUARE, LONDON, W.

French Lesson Notes: to accompany La Première Année de Français, Premières Lectures, and Black's Reform French Readers. By F. B. Kirkman, B.A. Oxon. This little book of teaching hints, notes, suggested questions and exercises, etc., will be of much service to teachers using the French series to which it is adapted.

Transcription phonétique de la Première Année de Français. By D. L. Savory, B.A. The alphabet of the International Phonetic Association is used, and the transcripts are as approximately correct as in similar books. This alphabet, however, is defective, the most serious omissions, perhaps, being a "middle e" and a "middle o." Few people, whether English or French, are aware how very often these two vowels are required. In a large number of cases where ɛ is printed, we should have "middle e," and ɔ should similarly be often replaced by "middle o." It is impossible to go into detail here. Suffice it to say that *les* and *des* are never pronounced with an ɛ in ordinary speech, while *rôti* is never roti. Paradoxical as it may seem, we believe that the teaching of a "middle e" between e and ɛ, and of a "middle o" between o and ɔ, besides being in accordance with correct French, would in the end cause the pupils to acquire the extremes with more certainty.

Arithmetical Exercises. By R. B. Morgan. Books of this kind are of great use, for a teacher must necessarily demand written work from his pupils. There is nothing new in this set, but the exercises are well arranged, and there are some oral questions leading up to them.

The Abbot. By Sir Walter Scott, Bart. The introduction to this workmanlike volume very clearly sets forth the inspiration and plot of the story, thus helping the young reader over what is frequently the initial difficulty—namely, the acquiring a ready interest. With such instruction the editor will find that more than fifteen per cent. will read Sir Walter Scott now. The paper is good, the type large and clear, and the binding strong. A few notes at the end are easy for reference, and the book is an important addition to "Sir Walter Scott" Continuous Readers.

BLACKIE AND SON, LIMITED, OLD BAILEY, LONDON, E.C.

Bacon's Essays. Edited by E. H. Blakeney, M.A. This book of essays is of a handy size for the pocket. It is well edited, and the notes are concise and clear. A brief sketch of the life of Bacon is given. It is surely a marvel of the ages that genius so great should be allied to a character in many ways so mean and time-serving. Tennyson said of the essays, "There is more wisdom compressed into that small volume than in any other book of the same size I know."

The Golden Treasury consists of selections made by Francis T. Palgrave, late Professor of Poetry in the University of Oxford, from the best songs and lyrical poems in the English language, with notes.

The Masque, or Pageant, of English Trees and Flowers; and **The Australian Cousin: a Play for Girls.** By M. F. Hutchinson. *The Masque* should prove very successful, if well performed. Little or no "acting" is demanded, but great clearness of delivery is necessary to make it go well. *The Australian Cousin* affords scope for the vigorous representation of a voluble Irish woman, but the "plot" of the play is lamentably weak.

Old Mortality. Edited by Wm. K. Leask, M.A. Sir Walter Scott's fine story of the Scottish Covenanters appears here in a cheap edition, with notes. In his introduction the editor falls foul of the "merely dramatic and picturesque school of writers, who believe that the story of kings and courtiers constitutes real history." Mr. Leask gives an admirable synopsis of the leading events of the period in his introduction, and goes a long way to remove the difficulties which always beset an Englishman engaged in the study of Scotland's history.

A Junior Latin Syntax. By J. A. Stevens, B.A. It is difficult to see what want this book meets. No exercises are included, and one fails to find any plan or method in the order. (Why, for instance, does the imperative follow the ablative absolute?) No use is made of distinctive type, and each section rambles on as one rule suggests another. The definitions are not always accurate, the explanations not often clear.

The Captivi of Plautus. By J. Henson, M.A. For a school book this is an unusually full edition. The notes are very numerous, dealing especially with the points of grammar in which the archaic language of Plautus presents some difficulties. A vocabulary is appended, which, for the same reason, will be found a very welcome addition. The hardest feature of these comedies is the scansion, and this is the part in which the editor's help is fullest. An appendix deals with the manuscripts and their variations, so that even the advanced student will find all he wants here.

The New Century Geographical Readers. IVa. The British Isles and Glimpses of Greater Britain. One-third of this book is devoted to Scotland and Ireland, the remaining two-thirds to Greater Britain. It is the ordinary kind of reader—a collection of miscellaneous facts, generally interesting, and intended probably to expand the information given in class. Generally speaking, it does not consider the causes or the effects of the facts given, and one regrets to find evidences that the writer has an imperfect knowledge of his subject.—**V. Europe.** Although in the same series, this book is far superior to the above. The facts are better selected, and causes and consequences receive mention. But the book has its chief value as giving graphic mental pictures of the regions and places considered. The text is lucid and sometimes quite picturesque; the illustrations are very well reproduced. The explanation and use of contour maps is a good and unusual feature. Altogether it should make a very useful adjunct to the formal geography lessons.

Kent: A Supplementary Reader. "The aim of this series is to quicken the interest of the pupils in their immediate surroundings.....Each book gives a brief historical and geographical account of the particular region with which it deals." The book gives a considerable amount of information, much of which might quicken the interest of the pupils; but, owing to the arrangement of the book, many of the historical facts are mentioned simply in connection with various places, and are not connected with each other. The geographical portions also lack co-ordination; the facts are largely isolated, and so the educational value of the book is less than it might be.

A Skeleton French Grammar. By H. G. Atkins, M.A. (Lond.), B.A. (Cantab.). This excellent compendium of the bare essentials of French grammar is now issued with a collection of exercises which double the volume—and the value—of the book. In the grammar the former device of printing important things (tense endings, etc.) in red is retained. The exercises are made, as far as possible, to bear on definite sections of the grammar, and most of them are connected wholes. In every case a French extract precedes the English-French exercise, and deals with similar matter. In this way the ugly combinations of uncouth words to which the ordinary exercise leads are avoided, *imitation* of good French (the only proper method) being what is here required.

Les Précieuses Ridicules. Edited by G. H. Clarke, M.A. This addition to the *Little* French classics goes far to belie the adjective which describes the series. The text, indeed, as everybody knows, is short (twenty-nine pages). To this, however, are joined a long introduction, and over sixty pages of notes and vocabulary. For school use this is excessive. A very short introduction, with brief notes on archaic constructions and words, leaving the rest to teacher and pupil, aided by a dictionary, would be more in keeping with modern views. To those, however, who like full notes we can recommend this edition.

The Water Babies. Kingsley. We have already drawn attention to the excellent series of English classics issued by this house, so no further words are necessary to commend Kingsley's delightful combination of fairy tale and nature study as a class reader.

Middlesex. In these pages the geological structure, the physical formation, and the political and historical facts connected with the county are placed before the children in a concise and interesting manner that will commend itself to all.

The Kindergarten Room. By Florence A. Tristram. This little book deals with twelve nature subjects—squirrel, frog, cat, etc. Each subject is treated thus: sketch for lesson, outline of lesson, story, game, occupation. The lesson, story, and game are given in full. When teachers are treating any of these subjects, this little book will be found most useful. The stories are simple, and the games suitable and bright.

Quentin Durward. By Sir Walter Scott, Bart. Edited by William Keith Leask, M.A. The greatest of Scott's examples in historical creative power is here presented to us in a neat and very serviceable cover; the type, too, is distinctly good. In the introduction the editor has given an excellent exposition of the European situation, rendering the reading of this historical novel more profitable, as well as more pleasurable. There are some twenty pages of useful notes appended, easy for reference under chapter and page.

The Last of the Mohicans. By J. Fenimore Cooper. This is one of the popular Blackie's School and Home Library Series, giving to the world a wonderful shilling's worth, strongly bound in an attractive cover, and clearly printed. It is a marvel of cheapness.

Prince Murough's Adventures. By D. Denny. A book of sixty-four pages, in limp cover, containing the adventures, and four other interesting stories dealing with Irish life and character, and printed and bound in Ireland, here comes under our notice as one of Blackie's Story Book Readers.

CAMBRIDGE UNIVERSITY PRESS, FETTER LANE, LONDON, E.C.

The Elements of English Grammar. By Alfred S. West, M.A. The numerous reprints through which this text-book has gone point to its extensive use. We know it well, and are friendly disposed towards it. It has served the needs of our senior scholars and pupil teachers admirably. Its tuition is of the best, its illustrations and examples are of the best, and the practice it provides in the way of tests are of the best too. The additional chapter, "On Essay Writing," is of exceptional value both to junior and senior scholars.

CASSELL AND CO., LIMITED, LONDON, PARIS, AND NEW YORK.

Vocabulaires et Descriptions. By F. P. de Champtassin. There is nothing new in this little book. It consists of lists of French words with English equivalents, followed by easy sentences with translations. The older books of the same kind are quite as good, and one would have thought that the modern methods of teaching French had rendered such compilations unnecessary.

Conversation in Class. By F. P. de Champtassin. This is similar to the above by the same author, but consists entirely of sentences. In these days of "French without tears," we pity the pupils who are required to work through such dry lists of disconnected matter.

French Lessons in French Series. By F. P. de Champtassin. No. 1 for boys; No. 2 for girls. Each of these consists of three pages of French sentences, such as might be used on the arrival of an unwelcome visitor, followed by an English translation of the same. That is all! The author says, "This monologue should be committed to memory." A few attempts at "phonetic" representation of pronunciation are made. For instance, "Qu'est-ce que c'est?" is rendered, "Case kuss say." This is precisely how *not* to do it.

W. AND R. CHAMBERS, LIMITED, EDINBURGH AND LONDON.

Business-Hand Copy-Books. The pupil who is led through the course of handwriting in this set of twelve copy-books ought to secure a clear and legible style of caligraphy. The aids in the earlier books are helpful, the gradation is systematic, and the paper of the very best.

Geographical Readers: Asia and Australia. The matter is placed before the children in a picturesque and attractive manner that will appeal to the imagination and arouse an interest in the subject. The book is profusely illustrated, and the summary at the end of each section will be found useful for revision.

How to Keep Well. By Dr. Andrew Wilson. Domestic science has now assumed sufficient importance to justify its appearance among the readers. The book before us is written in a clear and interesting manner, and contains much valuable

information on this important subject. The chapter on "What to do in accidents and illness" is particularly instructive.

Chambers's Concise Gazetteer of the World. Revised edition. Edited by David Patrick, LL.D. The test applied by the busy man to such a publication as this is to ascertain whether it tells him something of Peterhof, Oyster Bay, Meigle, and Albury rather than of St. Petersburg, New York, Perth, and Sidney respectively. He has a more or less definite idea of the great landmarks, but the newspaper reference to the smaller place which suddenly becomes world-famous for the moment sets him asking the questions, "Where is it?" "What is it?" We are bound to confess that this revised edition of a well-known and useful work stands the test very well. Then it is also requisite that the work should be as nearly as possible up to date. A glance at Port Arthur, Aberdeen, and Dover will satisfy the intending purchaser; but the article on the Isle of Man does not mention Greeba Castle, and contains the cruel sentence, "There is no literature beyond a few songs and carols." Nor does the column on Newcastle contain a reference to the King Edward Bridge. The Gulf Stream is not here; but it was always overrated. And if Holland House and Coxhoe Hall, why not Printing House Square?

CHARLES AND DIBLE, PATERNOSTER SQUARE, LONDON, E.C.

Observation Lessons in Plant Life. By F. H. Shoosmith. This book contains many valuable hints and suggestions for the correct study of botany—namely, by observation—and, at the same time, it deals with the subject sufficiently deeply to entitle it to rank as a text-book for fairly advanced students. The diagrams are delightfully clear, the majority being executed in white on a black ground, rendering them suitable for reproduction on the blackboard.

The "Suggestions" Historical Drawing Cards. By H. W. Donald. This has been called the age of correlation. Teachers have been asked to correlate all their lessons, making each one mutually assist every other as far as possible. The principle is excellent; the carrying out of it often the reverse. Mr. Donald has, however, succeeded in showing how the history lesson can be correlated with the drawing lesson in a thoroughly successful manner. He has selected such objects—simple pottery from the Celtic period; axe-heads and other weapons from the Stone and Bronze Ages; helmets, swords, spear-heads, etc., from the Viking Age—that fall well within the capacity of scholars in elementary schools to draw. The cards are really suggestive of what can be done in this particular subject.

THE CHURCH MISSIONARY SOCIETY, SALISBURY SQUARE, LONDON, E.C.

River, Sand, and Sun is the admirably descriptive title of a series of sketches of the Church Missionary Society Egypt Mission, written by Minna C. Gollock. The authoress has done wisely in limiting her book to a description of the work of the Church Missionary Society, but she expresses the hope that her book may stimulate interest, and draw out missionary sympathy for all those who are spreading the gospel in a land where once it reigned supreme. In especial she names the American Presbyterian Mission, which has worked on a larger scale than any other in Egypt for fifty years. That foreign missions deserve the fullest and most earnest support is her firm opinion. Where this conviction is lacking, the presumption is strong that the requisite knowledge is lacking also. This book is admirably calculated to give an insight into a successful and much blessed work. The illustrations are very well done.

In Salisbury Square. By Irene H. Barnes. Miss Barnes has already shown her deep interest in missionary affairs in a practical manner. Her book *Behind the Purdah* was a revelation to many of the life of Hindu women. In this volume she describes the work at headquarters—the daily life in the Church Missionary House, Salisbury Square. There is, naturally, much to attract attention in such a centre of influence, and Miss Barnes describes in felicitous style everything she has seen, from the ancient historic tomes in the strong-room to the details of accountancy in the cash office. Incidentally, the book shows the indebtedness of the Society to a succession of men of high ideals, resoluteness of purpose, and sanctified common sense.

Talks on Africa. This is a series of talks on missionaries and their work in Africa, designed to interest young people at home in missionary work. It consists of "instructions" to teachers and others who may deliver the talks to their charges, and includes what teachers would call "teaching notes," with blackboard summaries, additional explanatory notes on certain points, diagrams, maps, and recitations.

Notes on Africa for Missionary Students. This book gives a carefully written account of the land and its people, with special reference to the races, languages, habits, customs, and religions. Then the dealings of Europeans with Africa are historically considered, and their good and evil effects estimated. The need for missionaries having been shown, some stories of work accomplished are detailed, and the present outlook is described. The usefulness of the book is enhanced by appendixes and an index.

CLARENDON PRESS.

Poésies Choisies. By Alfred de Musset. Edited by C. E. Delbos, Upper Canada College, Toronto. The seventh of the Oxford Higher French series. As the name implies, these books are decidedly not for beginners, but advanced students will welcome them. The introduction deals with De Musset's life and poetry, freely illustrated from his own verse. The notes are almost entirely literary, and grammar is quite omitted; and these two sections take up very little of the book. The selections are numerous and well-chosen, ranging in date over the whole of the poet's career.

Plutarch's Life of Coriolanus. North's Translation. Edited by R. H. Carr, B.A. We have here, in modernized form, the work from which Shakespeare drew the plot for his Coriolanus, and the book will be useful to students of that work; but it is well worth reading for its own sake, for North's Elizabethan English is so masterly and expressive. The editor in his preface deals also very fully with the lives of Brutus and Antony, to which also Shakespeare was indebted, but of which the text is not here included.

Tales of the Civil War. From Cæsar's Civil War, Book III. By W. D. Lowe, M.A. The tales have been arranged to form a little book, which would make a very good first author for beginners. The Latin is Cæsar's own, but plenty of cutting has made it simple, and this is further aided by the author's plan of setting out all sentences separately. Corresponding to the chapters are simple exercises, and there is an English-Latin vocabulary for this part.

Latin Extracts and Greek Extracts. From Jerram's Anglice Reddenda. These extracts are already well known, having so far been published together; to suit the convenience of users the Latin and the Greek are now issued separately. The selections are very numerous—nearly four hundred in each volume—and are necessarily short, averaging perhaps two-thirds of a page; but each extract is generally complete in itself and interesting in its theme—a great recommendation. There is a complete index of reference, and nothing in the way of notes or vocabulary. One could not have a better collection of unseens. All the usual authors are included, and the order is generally according to difficulty.

JAMES CLARKE AND CO., LONDON.

Simple Cookery. Part I. Tasty Dishes; Part II. More Tasty Dishes. Over Five Hundred Tested Recipes. The "more" in the title must be taken in the adjectival sense, not in the adverbial, the dishes described in the text of Part I. not seeming in any way less tasty than those in Part II. The division is apparently due to the two parts having been prepared for issue separately. The recipes are of a common-sense type, not extravagantly expensive, and give a wide range of choice. A book well worthy of a place on the kitchen bookshelf.

W. B. CLIVE AND CO., DRURY LANE, LONDON.

Outlines of British History from 1017 to 1870. By M. E. Carter. A text-book issued by the University Tutorial Press is nowadays looked upon as an excellent examination guide. This book is no exception to the rule, and it is written specially for the Preliminary Certificate examination. To meet the modern requirement of a wider outlook, the last fifty pages are given to "A Sketch of the Main Landmarks of European History." The book is accurate and clear, but it bears the stamp of the examination guide—that is to say, it gives the necessary dates and facts, careful and impartial summaries, but it appeals only slightly to the imagination, and scarcely puts one in touch with the past. It aims at teaching history rather than the historical attitude of mind. But even in the history one wishes the social aspect were more considered, even at the expense of the less important political matters.

CROSBY, LOCKWOOD AND SON, STATIONERS' HALL COURT, LONDON, E.C.

New Grammar of French Grammars. Comprising the substance of all the most approved French grammars extant, but more especially of the standard work "Grammaire des Gram-

maires," sanctioned by the French Academy and the University of Paris. With numerous exercises and examples illustrative of every rule. By Dr. V. De Fivas, M.A., F.E.I.S. Fifty-seventh edition. Revised throughout and enlarged, with the addition of graduated French texts for preparatory reading and translation. The lengthy title of this well-known work says all that need be said regarding it. The long reputation which the book has already enjoyed will doubtless be maintained by the present improved issue, and the book deserves a wide popularity despite the number of competitors which have recently arisen.

J. CURWEN AND SONS, LIMITED, BERNERS STREET, LONDON, W.

Psychology for Music Teachers. The Laws of Thought applied to Sounds and their Symbols, with other Relevant Matter. By Henry Fisher, Mus. Doc. Cantab., author of "The Candidate in Music," etc. That the teaching of "music"—*i.e.* piano playing—should be placed under the same restrictions as vivisection, and permitted only to qualified practitioners in properly equipped laboratories, is not yet a practical suggestion, and the next best aim is to render the operation as painless as possible. To accomplish this, and to ensure that some degree of intelligence and some measure of educational insight should be infused into this form of teaching, may be regarded as the aim of this little book. Were all reference to psychology deleted, the book would be of no less value and would gain much in clearness. The practical hints and criticisms regarding methods of teaching are usually admirable. The writer evidently understands these thoroughly, and can enunciate them clearly. We can find no warrant in his book for saying as much regarding psychology.

How to train Children's Voices. By T. Maskell Hardy. This little book should find its way into the hands of all teachers of singing. The subject is handled in a masterly manner, and the information is of a thoroughly practical nature.

J. M. DENT AND CO., 29 BEDFORD STREET, COVENT GARDEN.

The Simpler Poems of Wordsworth and **The Shorter Poems of Longfellow.** Two excellent collections for school use. They are bound in limp cloth, and have very instructive little introductions.

Dent's First Spanish Book. Considering the importance of Spanish from so many points of view, it is really surprising that so few English people study it. The book before us forms a capital introduction to the language, and any one who works steadily through it will find that he has obtained a good knowledge of the language in its most useful forms.

Dent's Short French Readers. Under the general editorship of Mr. W. Rippmann, these little books meet a great need in our secondary schools, each supplying material for one term's reading. We have here the second volume of Perrault's *Fairy Tales*, and a choice selection of readings on the French Revolution. There are useful footnotes and questions, both in French.

Les Pélérins de la Tamise. This is an interesting account of the visit of some French children to England, interspersed with a few selected stories. The style is easy but quite idiomatic, and the subject matter naturally introduces countless everyday conversational phrases. There are some short explanatory notes in French, and some exercises based on the text, which make the book of far more use than an ordinary reader.

Rippmann's Picture Vocabulary. In this book the right-hand pages contain a number of pictures, and opposite to them are the names of the things designed. The idea is good, and the book can be used as the foundation on which to build either a series of conversational lessons or short composition exercises.

H. DIDIER, PARIS.

A Handbook of English Composition. By G. Camerlynck. This book, published in Paris, was intended primarily for use in French schools; but it is entirely in English, and therefore equally useful wherever English is taught to foreign pupils on these lines, and would also make an excellent class book for English pupils.

Our first feeling, we confess, is one of envy that French boys should be sufficiently at home with our language to use this book, while our pupils so often plod along on old-fashioned lines, and learn so little French.

The illustrations take a very large amount of space, and serve as material for composition. They roam over all sorts of purely English subjects, and so teach something of England as well as its language. For instance, with a plan of Hyde Park, one is asked to describe a drive round it, and a good map of the city is material for a description of a 'bus ride through it.

The author has shown wonderful ingenuity in devising exercises. We have tales to be told in the first person; others, told in the first, to be rewritten in the third; the battle of the Nile in the present tense, to be rewritten in the preterite; and so on. Simple tales are here with blanks to be filled in, giving good exercises in vocabulary; other exercises in which synonyms are to replace words indicated. But the many ingenious exercises are too numerous to tell; teachers of composition should get the book.

M. Camerlynck writes excellent English, but he should have had his manuscript corrected by a native. We notice "cycle-man" for cyclist, "tea and toasts," and "Lakist poets." Such errors are, however, very few.

A Handbook of Essay Writing. By G. Camerlynck. This is uniform with the above, and intended for higher classes. Its merits are much the same. For the essay the theme is named, and an outline suggested. This is generally followed by material for the essay, most often extracts from first-class writers. But most valuable to the teacher will be the notes on various topics—such as the loose sentence and the periodic sentence, the rhetorical style, emphasis, ellipsis, order of words, and inversion. Then, again, we have the construction of the sentence, the paragraph, and the whole essay. It is by no means easy to teach this well, and this book is a very helpful one.

JOHN FORRESTER, LONDONDERRY.

First Lessons in Number. By W. J. Browne, M.A. It is perhaps a good thing that in no book known to the author of these First Lessons is the science of number developed from the natural and ancient custom of counting by the ten fingers, and in very few is it even mentioned. These lessons *are* based on counting by the ten fingers, and very monotonous indeed do they become. No. We do not believe that such a system is "beautiful in its simplicity," nor do we advocate it. We would rather make use of Mr. Browne's despised "cubes, balls, sticks, and marbles." May we say, too, that we do not think "first lessons" should demand the working of such exercises as, "Multiply 99987 by 5872," "square 48932," and "divide 758433024 by 987543, using the Italian method." Poor little things! Young children cannot understand such complex tasks, nor have we any regard for those who impose them.

GALE AND POLDEN.

The Vaulting-Horse and How to Use it. By Guy Campbell. The vaulting-horse is, as a rule, the least popular piece of apparatus in the gymnasium. It, however, possesses infinite possibilities, and a perusal of the useful and graceful exercises explained in this little book should do much to increase its popularity.

ROBERT GIBSON AND SONS, LIMITED, 45 QUEEN STREET, GLASGOW.

Gibson's Progressive Arithmetic, Books I. to V. These books will do admirably for the compulsory work in arithmetic that will have to be taken shortly; but they go beyond the necessary requirements, and perhaps beyond the capabilities of ordinary pupils. For example, Book I. goes from the Infants' work to that of Standard II., but reduction, weights and measures, fractions, and *decimals* should *not* be taken. All these books are good, and the work is very varied, but they would be greatly improved if the books corresponded with the standards, as then confusion would be avoided, teachers naturally concluding that the books were numbered according to the different standards. There is plenty of variety to add interest to the arithmetic lesson, and the constant revision in *every* book with more difficult examples should make the pupils proficient in the previous work. Concrete examples are introduced at the earliest stages, but abstract examples are numerous, and will therefore secure sufficient practice in the manipulation of figures. The arrangement of the work is good, and the types and suggestions for mental work will be found most useful. The value of these books would be greatly enhanced if they could be made to correspond exactly with the standards; also if fractions and decimals were left for the fifth book, and sixth and seventh books arranged to complete the whole course taken in schools. We can thoroughly recommend these books for their practical work, and they well deserve the title of Progressive Arithmetic.

Literary Notes. This book consists of merely pages of foolscap size, arranged for pupils in the upper classes writing descriptions of books, with the following printed headings:—School, Class, Date, Title of Book, Author, Other Works, Locality of Story, Chief Character, Other Three Characters, Estimate of Chief Character, and then half a page to summarise

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the book. This is a new style of composition, which would be a good addition to the work of the first class in elementary schools, and perhaps for several classes in secondary schools.

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Brier Patch Philosophy. By "Peter Rabbit." Interpreted by William J. Long. Illustrated by Charles Copeland. In this work Mr. Long steps aside from the path he has formerly followed, and presents us with his *apologia* for his former works. People, it seems, have been carping at his representations of the character and intellect which he sees active in animals, and he here gives somewhat of a reasoned account of the faith that is in him. When we think of what a delightful interpretation of some more of the woodland dwellers he might have given us while he was writing this treatise, we are sorry he felt called on to do so. It will convince none of his sceptical friends. The guise of speaking as "Peter Rabbit" does not succeed in doing anything but giving tedium to the discussion, and tedium is a new element in Mr. Long's books. His charming descriptions of animal life are far more convincing than anything in this new volume, though here, too, illustrations of purposeful action are not wanting. In form and execution the book merits all praise. But we are sorry on behalf of the young readers who have learned to love Mr. Long's forest idylls, and who seize upon this for "more."

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Grillparzer's Der Arme Spielmann. This little story of a poor musician's devotion to his art forms a very suitable one for class reading. The language is fairly easy, and as but little space is taken up with passing notes on the text, the editor has devoted some pages to a discussion on the model auxiliaries and on sixteen adverbs and particles which are generally looked upon as difficulties in the acquisition of idiomatic German.

Lesage's Turcaret. Lesage is known to most people in this country as the author of *Gil Blas*, and nothing more, and few know even this novel except by name. Perhaps that is as well, but the delightful *comédie de mœurs* is well worth the student's attention. The present edition is well got up, and teachers who want a change from too much "direct method" and conversation will find a welcome relief in the bright dialogue of Lesage's play.

Victoria y obros cuentos. By Julia de Asensi. To the few teachers who have ventured to take up Spanish we can recommend this collection of stories as interesting and well edited. There is a complete vocabulary, and explanatory notes are also given.

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The Philosopher and the Foundling. By Georg Engel. This is a German novel translated by Elizabeth Lee. The interest of the story centres round the fortunes of old Kluth, the pilot, and the scene is laid in Moorlake, a Baltic village. In the opening chapter Kluth is dying, and decrees that his wife, with the help of Siebenbrod, the servant boatman, should bring up Paul, the eldest son, as a pastor; Bruno to be apprenticed to Hollander, the merchant; Hann, the youngest, to help the boatman; and Lina, his foster-daughter, whom he had rescued from a sinking vessel—well, "something would come along." The story traces the working out of this arrangement and its consequences. Paul eventually becomes the pastor. Bruno, the ambitious agent of Hollander, succeeds, but, as "vaulting ambition doth o'erleap itself," cannot stand success. Hann, the philosopher, is a really good character; the quiet, steady, enduring, and true workman denies himself for the sake of Lina, whom Bruno deserted in her great trial. Other characters in the story are old Kusemah, with his telescope and his busybody ways, and the two daughters of the schoolmaster; whilst Fräulein Dewitz is a good type of a maiden lady. The story, as a whole, is reminiscent of our own Thomas Hardy, and is a good study of human life. We do not recommend it as a prize book for children, but as a strong novel for adult readers it will undoubtedly command success.

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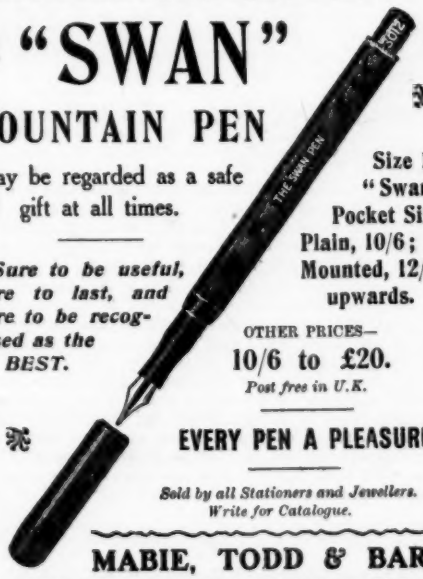

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Theoretical and Practical Mechanics and Physics. By A. H. Mackenzie, M.A., B.Sc. This little book, which is intended as a preliminary science course for artisans in evening schools, contains some well-arranged and suitable experiments on length, area, volume, mass, hydrostatics, and heat. The descriptions are clear, and the apparatus is usually of a simple character. In addition, a number of exercises are given.

Michel Perrin. Adapted and edited by F. L. Carter, M.A. An interesting little French tale of the revolutionary era, with vocabulary, notes, and exercises. Most of the notes are helpful. At the end there is a questionnaire in French on the substance of each page. This should give useful exercises on "direct" lines. The rest consists of retranslation of English words and phrases into French. There is, perhaps, too much of this, and the judicious teacher will probably omit considerable portions. Otherwise, he will run the risk of killing interest.

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Shakespeare's Macbeth. By C. W. Crook, B.A., B.Sc. The note of this edition is its completeness, and it is very easy to see in it the work of a practical teacher. The notes are at the foot of each page for the saving of time, and the book is interleaved with ruled writing-paper for the student's notes. Besides such features as most editions have, we notice several good things in the introduction and the appendix, such as the notes on the metre (the best we have seen in simple form), and an exhaustive list of figures of speech, with definitions and illustrations from Macbeth. The book is without pictorial embellishment.

A Scientific Geography. Book II. The British Isles. By E. W. Heaton. This is a book to be welcomed, in so far as it attempts "to afford some explanation of the facts" with which it deals. It is intended for students taking matriculation, preliminary certificate, or teachers' certificate. The author rightly sees that the geological structure of Britain is the cause of much of the geography; but one doubts whether other causes are adequately represented. As regards the geology, it is a pity that the section showing the structure of Scotland does not indicate the all-important rift valley forming the central lowlands, and that Fig. 5 shows the lowland coalfield as occupying by far too large an area. An orographical map showing the railways following the valley ways would be much more valuable than the series of separate diagrams of the various railway systems. In spite of some weak points, the book is an advance upon the old style of text-book.

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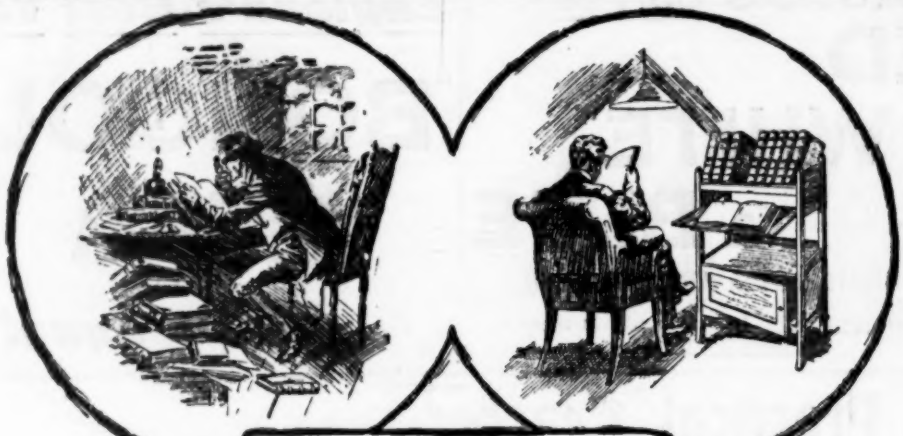

A Comparison

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IN these days, when every civilised country offers widespread facilities for popular education, it is almost impossible for us to realise the obstacles which half a century ago beset the path of those who sought by self-education to qualify themselves for a higher sphere of life than that to which they were originally called.

Professor Alexander Murray, who ultimately became the greatest linguist of his time, learned to write by scribbling his letters on an old card with a burnt heather stem.

Mr. John Burns, whose career all the world knows, has confessed that in his early days he had sometimes to decide whether he should buy a book or a pair of boots. Mr. Burns's library now contains some 5,000 volumes, and it is disturbing to think how many pairs of boots the Hon. Member for Battersea must have been compelled to forgo in order to amass this great collection.

Richard Arkwright, the inventor of the spinning frame, never had an opportunity of attending a school. He was entirely a self-taught man, yet his was the brain that gave to the world an invention which has added incalculably to the wealth and happiness of mankind.

William Cobbett was a poor soldier in a line regiment. The barrack room was his only study, yet in the midst of these uncongenial surroundings he steadily pursued the course of self-education which was destined ultimately to make his name a landmark in the history of English letters.

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